RAILROAD GAZETTE

FRIDAY, DECEMBER 28, 1877.

Locomotive Valve Gear.

The following description and illustration of this novel form valve gear is copied from *Engineering:*

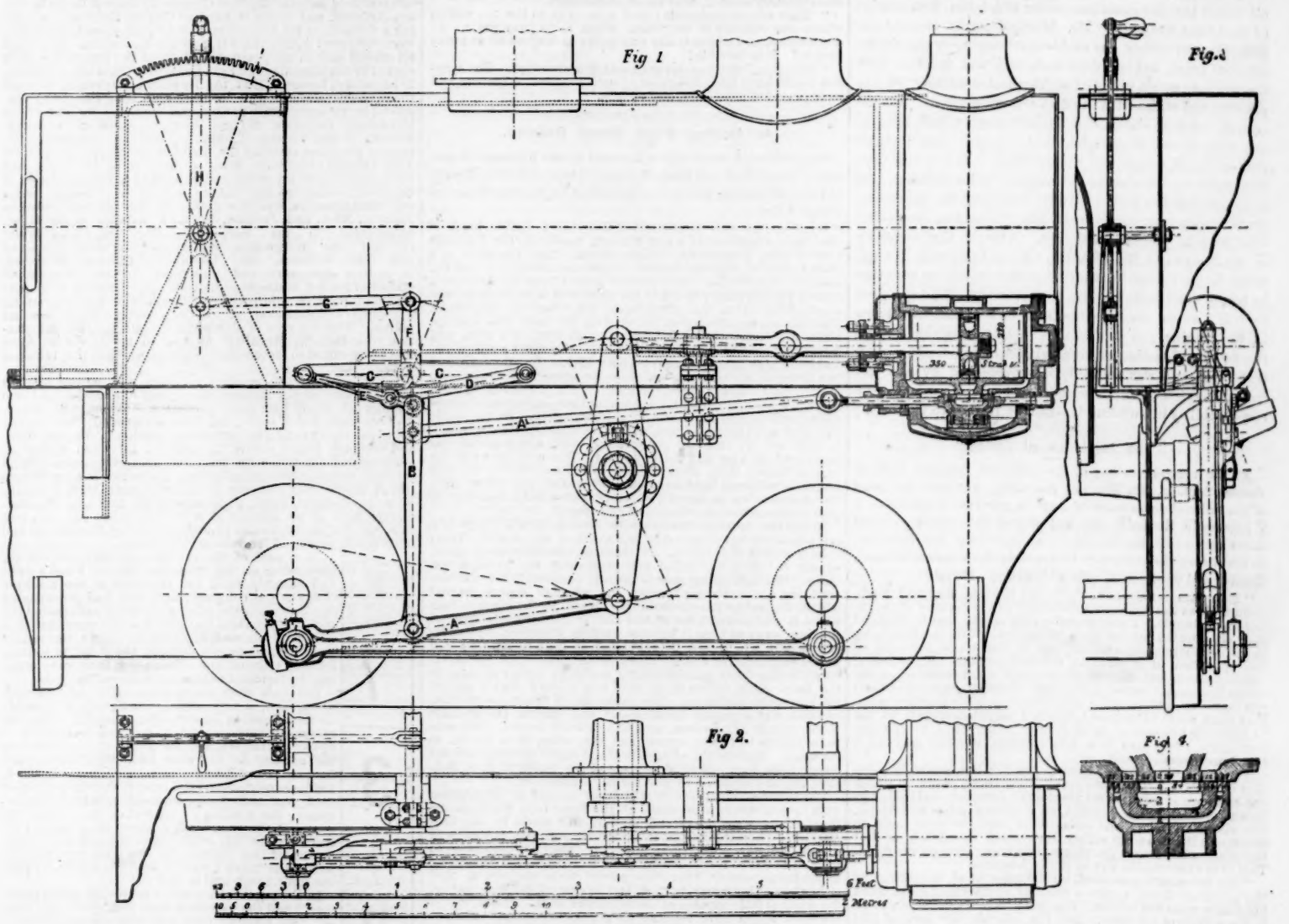
We give engravings showing an arrangement of valve gear for locomotives designed and patented by Mr. Charles Brown, the engineer of the Swiss Locomotive and Engineering Works, Winterthur, the gear being shown as applied to a small tank engine of a type which Mr. Brown has recently adopted for several purposes. One of the peculiarities of the engine is that the motion is transmitted from the pistons to the wheels through the intervention of rocking levers, as in the locomotive of M. Belpaire's design exhibited at Vienna by M. Carels, of Ghent.

Referring to the engravings, it will be seen that the gear consists of a pendulum lever B coupled at its lower end to the connecting rod A, while its upper end is connected with the pair of links D and E, which together form a parallel motion. The link D oscillates on a fulcrum pin at one end of the bar C, while the other link E slides through another pin at the opposite end of that bar. The bar C is fixed at the end of the weigh-bar, which is coupled in the ordinary way by the arm F and rod G with the reversing lever H. The slide valve K is coupled by a link to an intermediate point on the pendulum lever B.

With the parts arranged as shown in our engraving, it is evident that during the working of the engine the lower end of the pendulum rod B would describe a kind of distorted elliptical curve (due to its being coupled to an intermediate point on the connecting rod A) while the other end would move vertically in a straight line, being controlled by the parallel motion links D and E. Under these circumstances the intermediate point J, to which the valve rod is coupled, will describe a kind of ellipse of which the longer axis is vertical while the motion given to the valve will be approximately a reduced copy of that of the piston.

Such is the state of affairs when the arrangement is in mid-gear. When, however, the reversing lever is pushed over in either direction the bar C becomes inclined, thus raising the fulcrum of one of the parallel motion links and lowering the other, and the effect of this is that the upper end of the pendulum rod is no longer guided in a vertical straight line but in a line more or less inclined to the vertical. As a result of this the valve has imparted to it a motion derived from the point to which the valve rod is coupled, following an elliptical path of which the greater axis is inclined to the vertical, this path being, in fact, practically identical with that delineated on the ordinary elliptical form of slide valve diagram with which most of our readers will be familiar. The more the bar C is inclined the greater the travel given to the valve and the longer the period of admission. The result is, in fact, precisely similar to that obtained in a well-arranged link motion.

As will be seen from our engravings, the gear is admirably simple, and it appears to us well adapted for use on many other types of engines besides locomotives.



LOCOMOTIVE VALVE GEAR.

Constructed by Mr. Charles Brown, Swiss Locomotive Engine Works, Winterthur.

Contributions.

The Central Vermont Decision.

No. 13 CUSTOM HOUSE STREET, BOSTON, Dec. 21, 1877.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In your article of Nov. 9, giving the points of the Central Vermont decision, there appear to me to be two important omissions which gravely modify the actual opinion of the court. Referring to the trust or equipment bonds, Judge Barrett says: "The Vermont & Canada Railroad Company and mortgage bondholders of the Vermont Central Railroad Company hold a position relative to the subject different from that of the creditors of the trust. It was to render available the right of each that the compromise decree was made. We do not understand it to be controverted that *the expenses properly incurred are to be paid before the beneficiaries of the trust are entitled to partake of the earnings.* * * * It is true the managers were to hold and use the pledged equipments, * * * but not in such a way or sense as to make the pledges chargeable with the expenses of such use and service."

After stating that the Vermont & Canada Company and the mortgage bondholders of the Vermont Central are entitled to the "net earnings" according to the order of priority, the court defines "net earnings" to mean "what is left after paying the legitimate cost and expense of making earnings by the use of the property."

By these quotations you will see that to state, as you did, that "the decision places the holders of the trust debt in a very bad way," is to miss the true import of what the Court said. Whatever may be thought of the value or extent of the security attaching to the principal of the trust debt, or may be held as to the relation between the latter and the net earnings, considered strictly as such, the decision leaves no room to doubt that under the present ruling, the body of the property must be left untouched, and that its net earnings, to which alone the claims under the lease and mortgages adhere as a first lien, must be subordinated to the charge of interest on these equipment bonds; because the amount of what is really net earnings cannot be defined until the "legitimate cost of making earnings by the use of the property" has first been ascertained, into said cost entering the claim of the equipment bondholders, as they "cannot be charged with the expenses of the use of the equipment." In other words, the equipment was provided by the sale of these bonds, and the interest on the latter is a part of the chargeable expense on the former, and is to be deducted from the earnings of the property before the same can be called "net."

This would seem to be the plain meaning of the Court. Indeed, it is impossible to construe any other from the language used. Your publication of these remarks may bring comfort to many whose perusal of your former article was indeed a thorn in the flesh.

GEO. H. LLOYD.

The Invention of the Consolidation Locomotive.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Mr. Fry's letter in the last number of your paper contained a statement that I have seen and heard a good many times, to the effect that Mr. Alexander Mitchell "invented" the consolidation locomotive, and having often inquired just what Mr. Mitchell's invention was, without receiving much information. I now come to you with the same inquiry. It has seemed to me that his invention could not have been the placing of eight driving-wheels under an engine, for that had been done before, neither could it have been the pony truck, for that bears the name of another inventor; and the use of plain and flanged tires was already old at that time. My question is, just what mechanical devices were shown in the drawings furnished by Mr. Mitchell to the Baldwin Locomotive Works, or were afterward suggested by him, which had not been used before in locomotive practice. This should be a very easy question for some one to answer if you have not the information at hand, and please let us have facts only.

H.

Nov. 5, 1877.

[After inquiry among those most familiar with the facts we ascertain the origin of the consolidation engine to have been under the following circumstances: During the years 1864 and 1865 the Lehigh & Mahanoy Railroad Company had in use 6-wheel-connected engines with 4-wheeled trucks, also 6-wheel-connected engine (or Mogul) with 2-wheeled trucks to haul the coal transported by that company from the Mahanoy valley. Each class of engine did well, but could not haul, under the most favorable circumstances, over 22 cars, averging with lading 8 gross tons each, up a grade of 133 feet per mile; length of grade, 2½ miles. Finding it slow and expensive to get the coal up the last-named grade with the engine in use, in January, 1866, a drawing was made by Mr. A. Mitchell of an engine with 20×24 inch cylinder having four pairs of coupled wheels and a single-wheeled or pony truck in front, the object being to get an engine of sufficient power, with the weight well distributed and with the least possible dead weight, that would suit either on the above-named grade, or to run on the main line, as required. This design of engine was submitted to and approved by J. I. Blakslee, Esq., then and now Superintendent of that road, and at

his request submitted to R. H. Sayre, Esq., Superintendent and Engineer of the Lehigh Valley Railroad for his approval or rejection.

Mr. Sayre understood the difficulties connected with the coal transaction where the engine was to be used, and, after a careful examination of the drawing, recommended that such an engine be constructed. The design was then sent to M. W. Baldwin & Co., at that time proprietors of the Baldwin Locomotive Works, who did not approve using an engine so designed, and recommended using the eight-wheel-connected engine with flexible truck, also sending tracing showing the advantages to be gained by the use of the latter over the former, and the disadvantages and objections likely to be found in the adoption of an engine according to the drawing, but stating that they would build the engine but would not guarantee that it would be satisfactory in its workings or be responsible for it, and naming a price for it. The design was then shown to the Rogers Locomotive Company, and Mr. Hudson did not care to bid for an engine of that kind. Mr. Grant offered to build the engine for $19,500, but finally the order was given to the Baldwin Works. The original outline drawing is now in the hands of Mr. Mitchell. The details were agreed on by him and Mr. Henszey and worked out by Mr. Henszey, and both he (Mr. H.) and Mr. Parry know all about the circumstances under which the first engine of this class was built. Mr. Mitchell never claimed the invention of either the eight-wheel engine or the single-wheeled truck, but had used each, and was familiar with the working of all kinds of eight-wheeled engines in use prior to and at the time the first "Consolidation" was designed. But he claims that no such engine had been or was then in use, as an eight-wheeled engine with a single pair of truck wheels, or "pony truck," had never been used until used under the locomotive "Consolidation." He is not disposed to seek notoriety, or to provoke discussion, or to claim any credit regarding the engine, excepting what he is in justice entitled to. Without the authority of Mr. Sayre and Mr. Blakslee, who had the fullest confidence in the successful working of the engine, he says that he could never have had the engine built. The question by "*H*," as to what particularly new feature was shown in the engine, can be best answered by saying that it was the first combination of eight wheels coupled with a pony truck. That it was a novelty was evidenced by the fact that the best manufacturers were unwilling to assume any responsibility in building it.—EDITOR RAILROAD GAZETTE]

"The Insolence of Office."

At the second meeting of the Austrian Railroad Club, in Vienna, Sept. 18, Mr. Wm. von Noerdling, who is at the head of the railroad department of Austria, gave his impressions o a journey in England. He had visited the country several times before 1851, but not since that year until last Summer, so that he was in position to be struck by the contrasts between English and Continental railroad practice. He said:

"The main impression which my visit to England made upon me was the enormous difference in the manner of working the railroads. I may describe it by saying that in England they are operated on business principles. I do not here refer to the commercial department, but to the whole tendency of the operation in general, in contradistinction to the spirit which more or less inspires the railroad managements on the whole European Continent, from the Atlantic Ocean to the Eastern limits of civilization. I find that it is quite another spirit that rules on the Continent, which I might designate as the 'administrative spirit,' or, as I have undertaken to criticise that spirit, I may give it a less respectable name and call it the 'bureaucratic' spirit.

"To make this contrast clear to you, I will select an illustration from Paris. There are many great shops there, in which the customer is served most pleasantly, promptly and obligingly, and is treated and honored as a valued guest and friend. His wishes are asked, and endeavor is made to meet them, to anticipate them, and to satisfy them most completely, so that the whole affair leaves the pleasantest impression on the mind. This is the mercantile way of doing business.

"The bureaucratic method, on the other hand, is inspired by the so-called official spirit—a peculiar spirit which looks down insolently upon the public. The officials feel themselves to be in the service of the ruler. But the officials are divided into grades, and are inclined to consider the world also according to grades. Then naturally he who belongs to no grade (the public) comes below the lowest grade. If the official does not make his appearance at his office at the proper time, he does not consider it necessary to excuse himself. King Louis of Bavaria (so the story goes) one day noticed a crowd of people waiting at an office door to have their passes endorsed. As the officials did not appear, he himself wrote the passes. 'For my absent officers: King Louis I.'

"With pleasure I say it, in Austria this spirit is perhaps least perceptible, because here there is great good nature and no strict discipline. In France the democratic equality mitigates it. If the officials there are not always courteous, they are at least equally so to all. The official spirit is centuries old. I can in this relation refer to an authority which no one will except to—to Shakspere. You know that Prince Hamlet makes a list of the things which drive men to suicide. Among them he numbers the pangs of disprized love, then, the law's delay. After this comes the third cause: 'The insolence of office.' This spirit then had reached a high development even in England in Queen Elizabeth's time: to-day only a little of it is left.

"How the bureaucratic example is reflected even in trade in many continental countries I may illustrate by the following anecdote, for the authenticity of which I can vouch. The place where it happened is no matter. You may imagine it to have been in Munich, Pesth, or Berlin. A lady enters a shop; she has to wait a long time until the merchant has finished a conversation which he was having with some one partly for amusement. Finally he asks her:

"'What do you want?'

"'I would like to buy some stuff for spring clothing.'

"'What kind of stuff do you want, woolen or cotton?'

"'I would like to see what you have first.'

"'How wide?'

"'The width is a matter of indifference to me.'

"'What color?'

"'I have not decided: I would like to see what kinds of materials you have?'

"'But if you don't know what you want, I can't get it: I can't show you my whole stock. As soon as you know what you want to buy, come back to me.'

"I think now that I have sufficiently defined the mercantile and the bureaucratic spirit, and return to my impressions of travel."

There are many interesting things in these "impressions," but of course they are not what would most strike an American railroad man, the comparisons being with the Continental practice, which is to most of us less familiar even than the English. This definition of the bureaucratic spirit, however, is universally applicable, and we fear that it is not confined to the officers and agents of governments and of government railroads, but that it sometimes makes itself manifest among the employes of a great corporation, and, possibly, behind the desks of first-class hotels.

It is further illustrated in another part of this same address:

"When I got back to the Continent, in France, Belgium, and in fact in all continental countries, I was made to feel that I was no longer a traveler, but an object of regulations. Really one is led to think that the regulations are not made for the sake of the traveler but that the traveler exists for the sake of the regulations. Times innumerable was I discommoded to show my ticket; even at night I was awakened repeatedly.

"A matter which amused me very much soon after my return was an occurrence on a German State railroad. It was a Sunday morning, and a great many passengers were getting in at a station. After a while all the third-class cars were filled, and they kept on coming; then the second-class, and finally all the cars in the train were filled. I asked the conductor, who was evidently excited, who these people were.

"'They are excursionists; they want to go to the —— valley, where the country is very fine. What have they got to do down there, and where is any one going to dispose of so many people? It is horrible!'

"'Horrible,' because the man was discommoded. The English would have been delighted at such a source of income and have provided more cars, and rightly."

An Inclined Plane Street Railroad.

The California Street Cable Railroad in San Francisco is now nearly completed and ready for use. It extends from Kearny to Fillmore streets, and is thus described by the San Francisco *Evening Post*:

Between the two points stated there is a double track of steel rails, which are of a new pattern, made at the Cambria Iron Works, Johnstown, Pennsylvania. They resemble a T placed on trees, and are claimed to possess advantages over the ordinary street rails. They were imported from the East at a cost of about $20,000, which is the only item of expense in the construction of the road given to any place out of this State. The rails are hot riveted on the shelves of bent iron frames, which are placed at four feet distances all along the line, and firmly planted in a foundation and wall of cement a foot thick. The bend is so shaped that it leaves a hollow for the cable to run through, while at the same time the frame is strong enough to give solid support to the track rails. On the surface, also, there is a layer of cement, over which there are square stones which make a firm, level and durable pavement. As the cable will have solid surroundings, without any introduction of wood, it will not in running produce the loud, disagreeable roar heard on both Clay and Sutter streets. The cement walls run in continuous lines from Kearny to Fillmore street, and will not, it is believed, need any repair for years, any more than the stone surface pavement, which is beaten down in a way to give it the consistency almost of one piece.

Under the street, at the line with Kearny street, there is a cell almost 60 feet long and of the width of the double track, thickly walled with brick. It contains the tightening gear, wheels to carry the cable and machinery for taking in the slack. The tightening gear is entirely automatic, the machinery being a movable car bearing the wheel or sheave around which the cable passes from one track to the other. This wheel can be moved some 35 feet and is held tightly against the rope, so as to keep it without warp in the tubes, by means of a weight which can be regulated as high as ten tons and hangs suspended in a shaft about 30 feet deep. As the car is on an incline track and the weight is always acting as soon as the least slack occurs in the wire it is at once drawn taut by the automatic appliance. The cables are of flexible steel wire, one inch and a quarter in diameter and having 114 separate pieces closely interwoven around a heart of hemp. One acts from Kearny to Larkin street and the other from Larkin to Fillmore. The weight of each is about 43,462 pounds and the length 9,000 feet. They were made at the works of A. S. Hallidie and are expected to give perfect satisfaction.

The engines, which are located under ground at the junction with Larkin street, were made at the Hope Iron Works on the Potrero, are very heavy and strong, and made in the best manner. They are upright inverted engines, with cylinders 22 inches in diameter and 30-inch stroke. They are calculated to work at about 90 revolutions per minute, and can be worked up to 500 horse-power. There is a pair of these engines, so that either one or both may be used, and in case of damage to one, the other is fully capable of doing all the work. Piston valves are used which have separate chests for steam and exhaust. The valve motion is operated by stationary link. The governor is attached directly to the steam valve rod and varies the point of cutoff according to the duty required. The Porter governor is used, and is so arranged as to apply to either or both engines.

The bed plate for each engine is cast separate and they are bolted together; on them stand the columns which support the cylinders. The bed plates weigh about six tons each, and the frames for each engine also weigh six tons. The cylinders and steam chests weigh about four tons for each engine. The shafts weigh a ton and a half apiece. The crank disks weigh four tons each, and are six feet in diameter. The fly wheels weigh six tons each, and are nine feet in diameter. The two driving pinions on the engine shaft weigh 2⅛ tons each. They are 4⅛ feet in diameter, 18½ inch face, and 3½ inch pitch. The engine shaft is 9½ inches in diameter. * *

The main shaft will extend out to the middle of California street, where the main driving gears are in line with the centre of the railroad track. This obviates the necessity of bringing the wire cable at right angles from its general line. The engines stand 18 feet high. The bedplates will be 20 feet below the sidewalk, and are to be set in brick and cement. The engines are plainly made, with no extra finish, the valve gear alone being highly finished, and their cost was $13,500. * *

Engines, boilers and other machinery are placed in excavations which are strongly built, partly under the sidewalk and partly under the building at the corner of California and Larkin streets. The excavations are 31 feet in depth below the surface of the street, 110 feet in length and 30 feet in width. Wherever possible, fireproof arches have been built over the machinery, and all around there is a solid body of masonry. The driving machinery is in the centre of California street, immediately in front of the building, the track passing directly overhead. It will be necessary at this point to drop the cable for about 25 feet, the car passing over by its own headway, the surface of the street being warped so as to be down grade in passing this point for up and down cars. The main shaft connecting the engines with the driving machinery is about 30 feet long and 9½ inches in diameter, passing through a bricked tunnel which connects the engine room with the excavation under the track. Automatic appliances for taking in slack cable similar to those at the Kearny street end exist here also for the Fillmore street section of the line, and it is believed that no inconvenience will be ever experienced in keeping the wire taut. * *

The cars are of an improved pattern with covered tops and elevated centres. They will run nearly a foot lower than the present street cars. Thirteen are being built by George P. Kimball, of this city, and twelve by the California Manufacturing Company at Sacramento. They will seat sixteen persons comfortably, and have platforms at each end. In appearance they are the prettiest cars ever manufactured on the Pacific coast. The dummies are also of a new pattern, and are twenty-five in number. They will accommodate with seats eighteen persons; have springs to relieve them from all jolt, and are as attractive for passengers as the cars. Fifteen of these dummies have been built by George P. Kimball, and ten by the California Manufacturing Company, of Sacramento.

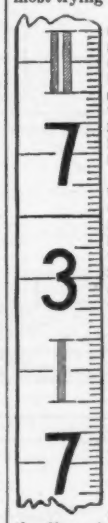
A Novel Railroad Survey.

[A Paper by Thomas S. Hardee, C. E., Member of the American Society of Civil Engineers, read at the Ninth Annual Convention, April 24, 1877.]

I herewith present for the information and consideration of this Society the features of what I shall term a "novel railroad survey," which was conceived and executed under my management, over certain portions of the States of Mississippi and Tennessee.

The circumstances attending the necessity for, and the objects to be attained by such a survey were as follows, viz.: the original field notes of the New Orleans, Jackson & Great Northern Railroad, and of the Mississippi Central Railroad, embracing a distance of 441 miles from New Orleans to Jackson, Tenn., were destroyed during the war, and this destruction obliterated all official data in the possession of these two companies, with regard to the alignment and gradients over that entire distance. It happened, however, that the location of the roads, through the different sections and townships of land, had been preserved by various private parties, and the notes for the entire alignment, therefore, did not prove very difficult to be restored. It also fortunately happened that the gradients, or a copy of the notes showing the undulations of the track from New Orleans to Jackson, Miss., a distance of 183 miles, had been preserved in my private possession as a former *attache* of the road, so that the only information to be regained, under the circumstances, was the profile of the roadway between Jackson, Miss., and Jackson, Tenn., a distance of 358 miles. Subsequent to the war, and after the consolidation of the two companies, under the present title of the New Orleans, St. Louis & Chicago Railroad, it became necessary and important for the economical transit of loaded trains from Cairo to New Orleans, to be possessed of positive information with regard to the intervening gradients or undulations of the track between these terminal points. With the view of obtaining, or restoring, this information, the General Manager* applied to me to devise some means by which to accomplish with expedition, the required work.

It was not desirable to adopt the slow and tedious method of an ordinary survey through the agency of a leveler and one rodman (as would have been necessary, if an original survey, over an unexplored route, had been demanded); but as the principal object to be attained was expedition in the execution, and economy in the cost of the survey, I devoted myself to studying out the following described plan, which was carried through to a successful termination. It resulted in a continuous line of levels being run over the railway route, from Jackson, Miss., to Jackson, Tenn., a distance of 358 miles, in less than eleven days, or an average of over 32¼ miles per day, and this, too, during the month of July, or during the hottest and most trying season of the year in this climate.



As a part of the preliminary arrangements for embarking on the projected survey, I had a light and suitable hand car prepared at the machine shops of the company, and also had constructed two leveling rods after a peculiar pattern and design, the principal features of which were that they would offer unusual facilities for noting the reading from the instrument, without the delay in waiting for the tally of the rodman—or they were what may be termed as improved self-reading rods.

The rods were constructed after the accompanying plan, so as to offer as few figures as possible on their faces to confuse the eyesight. The feet measures were painted in red, and designated in roman characters, and the centre of the figure was the reading for the even foot. The intermediate figures, representing tenths, were in plain black, and so arranged that the centre, bottom and top of each, represented an even tenth of a foot. For instance, the reading of 1.3 feet on the rod was the centre of the plain black 3, above the roman I; 1.4 feet was the top of the same black 3, and 1.2 the bottom of that figure. In the same way, the bottom of the black 7 was 1.6 feet, the centre 1.7 feet, the top 1.8 feet, and so on.†

In the organization of the surveying party, therefore, I had the following force and outfit: one hand car, two leveling rods and four assistants, two of whom acted alternately as rodmen and propellers of the hand car.

The initial point at Jackson, Miss., was taken from an established bench mark, immediately on the line of the road within the depot grounds, and this bench mark showed a reading of a certain number of feet above tide evel as projected originally from the seaboard.

The situation at the start can be exemplified by the following diagram, viz.:

*R*1. A *R*2. B *R*1.
0 1 0 1 0

In this connection, I would state that, as the allignment, including tangents and curves, was not in question, there was no pressing necessity for a re-survey in this direction, and as the mile posts were established over the whole route, as checking points, at stated intervals, the counting of the bars of iron, which were of uniform lengths, in the selection of turning points, enabled the survey to be conducted with all the practical precision required for a profile of the gradients as they bore a relation one to the other.

At the start the forces were thus distributed: *R*1 represents the position of rodman No. 1; *A* represents the hand car at a distance of 400 feet north of Rodman No. 1; *I* represents the instrument, planted in the centre of the track immediately in front of the hand car; and *R*2 represents rodman No. 2—400 feet north of hand car. The distance between the two rodmen was about 800 feet, whenever the topography of the country

* E. D. Frost, C. E., Member of the Society.

† The intermediate hundredths were graduated on the rod so as to be easily discernible at a maximum distance of 400 feet. The centre between any 2 feet was designated by a plain heavy black line running entirely across the face of the rod—as for instance, 1.5 feet.

would admit of a maximum sight of 400 feet each side of the instrument.

As soon, therefore, as the instrument was adjusted and an observation taken on the rod at *R*1, a signal was given which started rodman No. 1, in a double quick, towards the hand car. By the time the instrument had been reversed and the sight obtained on the rod at *R*2, the first rodman was seated on the hind end of the car, and with the instrument folded upon my lap, on a comfortable seat on the front of the car, the two assistants propelled the whole party (with the exception of rodman No. 2, who remained fast) at a rapid rate over a distance of 800 feet to the second position at *B*. As soon as the hand car stopped, rodman No. 1 made a double-quick 400 feet in advance to his second position, and by the time the second back sight had been recorded at *R*2 he was in position with his rod for a foresight. This double-quicking of the rodmen was kept up until they were fatigued, and their places were then supplied by the two assistants, who were acting previously as propellers of the hand car, and in this way the labor was so evenly distributed that the day's work of 30 odd miles was wound up without any extraordinary fatigue to any one of the assistants. It will be observed that the leveler had no walking whatever to do, and I managed to keep up all notes and calculations as the hand car was passing from one position to another.

The most difficult and trying portion of the survey was the anxiety constantly engendered for the safe passing of all trains approaching both in front and in rear, so as to avoid the disasters of a collision; and to provide against any contingency of this nature I was furnished at each station with telegraphic information of the probable position of all approaching trains. By this precaution and by exercising the utmost vigilance, I escaped with no actual accident; but on one occasion it was a mere scratch that a serious one was obviated. It was late in the evening and on a portion of the road where there was a long curve, and where there had been recently laid some new fish-bar iron; although I knew there was an approaching passenger train, behind time, I was closing the day's work and ventured too far, relying somewhat upon the ear, or hearing, to guide me in the approach of the train. It approached so noiselessly over the new-laid iron that I was caught almost in a trap, with a train running at the rate of 30 miles an hour bearing down upon us; but, owing to the lightness of the hand car, and the energy and coolness displayed by my assistants, we made a most fortunate and hairbreadth escape. I mention this circumstance only to show the difficulties which constantly surround such a survey, and to show, also, that it was no small undertaking, even in a physical point of view, to take the observations for, and to record the level notes over, a distance of 33 miles in a single day.

It may be well to remark that there was no extreme accuracy required in the line of levels to be run, such as would have been necessary on a canal or water route, and, therefore, the results, although only relative and approximate, answered all that was needed for a practical solution of the questions and interests involved.

MR. WILLIAM H. SEARLES.—By way of analysis of this extraordinary survey, I have been making a few figures which may be interesting to the Society.

Taking the average day's work at 34 miles, each rodman's duty was to run 8½ miles at a double-quick, ride 8½ miles at ease, and propel the hand car (assisted by another rodman) for 17 miles per day. I can only express my admiration for the physical endurance which could sustain such a strain with impunity for days in succession, under the scorching rays of a July sun in a Southern climate.

Again, with a setting once in every 800 feet, there would be 224 settings in 34 miles, which, at three minutes each, would consume eleven hours and twenty minutes, to which must be added the time necessary for refreshment and to avoid passing trains.

To mount a car, ride 800 feet, dismount, set up an instrument, take readings in opposite directions and record them, all in three minutes, and to repeat the operation continuously for eleven or twelve hours a day, is almost as remarkable a feat as that of the rodmen.

I offer these remarks just as they have occurred to my mind —not at all in a censorial spirit, but simply for the purpose of lending additional interest to this latest achievement in modern engineering.

MR. THOMAS S. HARDEE.—In reply, I would state for the information of the members of the society that my assistants were four able-bodied *Africans*, who were fully capable of enduring the amount of fatigue and physical labor so graphically pictured by Mr. Searles, and who were also sufficiently intelligent to acquire, almost immediately, all the mechanical skill needed in the handling of the rod.

I doubt if the same amount of work could have been performed in the same time and under the same circumstances with white labor, and therefore I consider that the success of my enterprise, as a novel feat of field engineering, depended in a great measure upon the use of African muscle and its peculiar application in the manner described.

The Cost of Railroad Transportation.

The following forms part of the last annual report of Mr. H. S. Haines, General Superintendent of the Atlantic & Gulf Railroad:

In the earlier days of railroads the advantages possessed by the communities which used them were so apparent that their less favored rivals eagerly sought for similar facilities of transportation. The development of the railroad system of the country led to competition for business and to reduced freight and passage rates where competing roads were constructed. Where there was no competition, rates were not reduced, and those who were compelled to pay them considered this discrimination as unjust. On the other hand, railroad managers claimed that the rates in question were not too high, but that the rates at points of competition were too low. Whether the rates were too high or too low was a mere matter of opinion, as those who used the railroads were without the information necessary to ascertaining the truth, and those who managed them did not supply it. Popular discontent became so intense as to attract aspirants for political preferment, and in some parts of the country, railroad monopoly and discrimination in rates took their places among the political questions of the day.

When thus brought to bay, railroad managers were compelled by public opinion to find out that which was to themselves of the foremost importance to know, to wit: The cost of transporting freight and passengers. In the outset, the results were crude and inaccurate, based upon insufficient data and illogical reasoning; but as more attention was paid to the subject, better methods obtained, and by reason of this popular agitation, railroad management has developed into a science. A scientific treatment of the subject has enabled railroad managers to acquaint the public with the general principles underlying the cost of transportation, upon which much light has been thrown in the recent combat of the giants for the grain trade of the Northwest.

Special attention has been given to the exposition of these principles by Mr. Albert Fink, C. E., late Vice-President and General Manager of the Louisville & Nashville & Great Southern Railroad, by whom the operations of that road have been submitted to an exhaustive analysis with results of value, not only to the owners and patrons of that road, but also to railroad interests generally, and to the public at large.

Instances of dissatisfaction with the rates charged by the Atlantic & Gulf Railroad Company have been brought to the attention of the management, and while each case has been fully heard, and it is hoped has been satisfactorily adjusted, yet the importance of a right understanding of the matter among the patrons of the road, who are so largely its stockholders, entitles the matter to a consideration in this report.

The various items of expense incurred in operating a railroad do not bear the same relation to the amount of business done upon it; some of them are not at all affected by it, some very remotely, and others are increased or diminished in proportion as there is more or less business done. The expenses should therefore be classified according as they are affected by the amount of business done, as follows:

CLASS A—FIXED EXPENDITURES.

Salaries and office expenses of general officers, legal expenses, rent, taxes and insurance, repairs of bridges and of buildings, maintenance of earthwork and fences, etc., and filling trestles, purchase and maintenance of machinery, tools and implements, furniture and fixtures, subsistence and pay of bridge watchmen and laborers not specially designated, and telegraph expenses.

This class of expenditures remains the same whether the business done is much or little.

CLASS B—EXPENDITURES BUT REMOTELY AFFECTED BY THE AMOUNT OF BUSINESS DONE.

Stationery and printing, maintenance of wood and water stations, renewal of cross ties, supplying water for locomotives, labor on track, wages of agents and clerks, watchmen and switchmen.

This class is but remotely affected by the amount of business done, *i. e.*, if the business were very largely increased or diminished.

CLASS C—EXPENDITURES AFFECTED BY TRAIN MILEAGE.

Renewal of rails and fastenings, frogs and switches, maintenance of locomotives, oil, tallow and waste for locomotives, pay and subsistence of conductors, engineers, baggagemen, firemen and train hands, stock killed by trains, accidents to trains.

CLASS D—EXPENDITURES AFFECTED BY CAR MILEAGE.

Maintenance of cars, oil, tallow, and waste for cars, fuel for locomotives, hire of cars.

CLASS E—EXPENDITURES AFFECTED BY TONNAGE.

Labor loading freight, loss and damage to freight.

The classification here given is in sufficient detail to show that the expense of operating a railroad does not increase or diminish directly with an increasing or diminishing business; that one class of expenses bears no relation to it; that other classes depend upon the amount of service performed by the engine and cars whether they are earning much or little, and that but a very small class bears a direct relation to the number of tons of freight shipped over the road. It may also be noted that much of this expense has to be incurred in anticipation of business that may be less than was expected, and that expenses cannot be diminished in exact proportion as business falls off.

It must next be stated that the business of railroads is twofold in its character; it transports passengers as well as freight and to ascertain the cost of performing each class of service, the operating expenses must be apportioned to the respective service for which they were incurred.

This cannot be accurately done with all classes of expense, and the apportionment must, to some extent, be based upon the relative volume of the two classes of business.

THE EXPENSES SPECIALLY INCURRED FOR PASSAGE BUSINESS ARE:

The salaries and office expenses of officials employed solely in this service; also of conductors, engineers, firemen and train men employed on passenger trains, and of baggagemen and porters at passenger stations, maintenance of passenger engines and passenger cars, advertising trains and other printing and stationery used solely in this service.

THE EXPENSES SPECIALLY INCURRED FOR FREIGHT BUSINESS ARE:

The salaries and office expenses of officials employed solely in this service; also of conductors, engineers, firemen and trainmen employed on freight trains, and of laborers, watchmen, etc., at freight stations, maintenance of freight engines and freight cars.

All other expenses must be divided between freight and passage traffic upon some recognized basis, and that of the respective car mileage performed in each service will answer the purpose,

In accordance with the classification here suggested, the operating expenses of the Atlantic & Gulf Railroad in 1876 would be divided as follows:

	Freight.	Passage.	Total.	Per cent. of entire expense.
Class A.....	$94,359 48	$38,669 95	$133,329 38	22
Class B.....	143,132 89	49,200 00	192,332 89	32
Class C.....	77,837 43	84,325 96	162,163 39	27
Class D.....	65,861 94	33,076 04	98,937 98	16
Class E.....	19,701 01	.....	19,701 01	3
Total op'g exp..	$401,192 70	$205,271 95	$606,464 65	100

In the above division of expenditures classes A and B are divided according to the respective passenger and freight car mileage for the year, first charging certain amounts specifically incurred in each service. Class C is divided according to respective passenger and freight-train mileage; Class D according to respective passenger and freight-car mileage, first making specific charges for car repairs, and Class E, being the cost of handling freight, is charged entirely to freight service. According to this classification, the operating expenses of the road for the year have been proportionately incurred.

For fixed expenditures, unaffected by amount of business done	22 per cent.
For expenses remotely affected by amount of business done	32 per cent.
For expenses affected by train mileage	27 per cent.
For expenses affected by car mileage	16 per cent.
For expenses directly proportioned to amount of freight handled	3 per cent.

Therefore, any increase or decrease in the amount of freight handled, affects only 3 per cent. of the total cost of operation, unless a greater or less number of cars is required, or the cars are required to run a greater or less distance. If this be the case, then 19 per cent., or about one-fifth of the total expense, may be proportionately increased or lessened.

If the increase of business requires more trains to be run, then 46 per cent., or nearly one-half of the total expense, may be proportionately increased or diminished. But there remains 54 per cent. of the total expense of operating the road that, for practical purposes, can not be decreased with a diminishing business without impairing the efficiency of the road, and need not be increased when more business is offered.

The freight service has cost—

For loading and unloading freight (Class E.)	11.5 cents per ton.
For every mile a fr't car was hauled (Class D)	1.4 cents per mile.
For every mile a freight train ran (Class C)	27.8 cents per mile.
For every ton of fr't hauled one mile (total exp.)	2.13 cts. p'r t'n m.

Although the above figures show that the average cost for hauling one ton of freight one mile over this road has cost in 1876 the sum of 2.13 cents, it does not follow that each ton that has been transported has cost that amount. Here it is that the facts are obtained that are to be considered in fixing rates from competing points. If freight is offered at a competing point that can be carried in a car that would otherwise run empty, the only cost incurred is that for loading and unloading the freight, viz.: 11½ cents per ton; all obtained over that amount would be clear profit. If a car has to be sent for the freight, then an additional cost of 1¼ cents per mile is incurred for the distance that the car runs to perform the service. If the freight offered amounts to enough to load a train, then the additional sum of 27.8 cents per mile must be added.

As a practical illustration of the use that can be made of this information, let us suppose that cotton is offered for competition from the Chattahoochee River at Bainbridge for transportation to Savannah, 237 miles:

If there is an empty car at Bainbridge, the cost will be for handling 10 tons of freight at 11½ cents per ton	$1 15 per car
If a car has to be sent for the freight, add the total distance, 474 miles, at 1½ cents per mile	6 64 "
Total cost per car-load will then be	$7 79 "
But if a train, of say 15 cars be required, then the cost will be for 15 cars at $7.79 per car	116 85
And for train mileage, 474 miles, at 27.8 cents per mile	132 72
Total cost per train of 15 cars	$249 74
" " car	16 64
" " ton	1 66
Or for bale of cotton, say	41¼
If only a car-load was shipped, the cost would be per bale	19½

The example here given will illustrate the way in which business obtained by competition, even at low rates, assists to lighten the burden of those who must pay full local rates.

The total freight earnings of the road in 1876 were	$665,374 99
Deduct express freights	13,856 27
	$651,518 72
Proportion of operating expenses	401,192 70
Surplus above operating expenses	$250,226 02
The total passage earnings in 1876 were	196,360 01
Add mails	32,935 90
And express freights	13,856 27
	$243,152 18
Proportion of operating expenses	205,271 95
Surplus above operating expenses	$37,880 23
Surplus on freight business	250,226 02
Incidental earnings	64,807 04
Net earnings	$352,913 29

	Per ton of freight hauled one mile.	Per passenger hauled one mile.
Average earnings	3.46 cents.	3.40
Average expenses	2.16 "	3.55
Average net earnings	1.30 "	Average loss 0.15

As here shown, the average cost of transporting a passenger one mile has been more than the average earnings per mile from this source, though, as shown above, the earnings from mail and express freight on passenger trains result in a surplus of over $37,000. It must also be remembered that a proportion of the fixed expenditures have been charged to passenger-train service that would have been incurred whether a passenger train ran or not. But after making all these allowances, the management of the road is satisfied that it is not profitable to run trains solely for passenger service, and therefore do a very considerable amount of freight service by passenger trains.

As shown by this report, the cost for hauling a passenger car one mile has been (Class D) 1.8 cents per mile, and the cost of running a passenger train one mile (Class C) 28.8 cents per mile. To illustrate the cost of passenger business where competition exists, the following illustration will be of service, viz.: in fixing a passenger rate from Jacksonville, where a very considerable competition exists. In this business the passengers are delivered to this company at Live Oak, 180 miles from Savannah.

If it is a question of obtaining one or more passengers without providing additional passenger cars, the additional cost is inappreciable, and therefore any revenue thus obtained is clearly a profit.

If an additional car has to be furnished, the cost for the car would be, 360 miles at 1.8 cents per mile, $6.48 per car; or for a train of say five cars:

For the five cars, at $6.48 each	$32 40
And for 360 train miles, at 28.8 cents per mile	103 68
Total for train	$136 08

From this it will be seen that any additional revenue gained by low rates from Jacksonville is almost clear profit, since the cost of performing the service is not thereby appreciably increased.

The local passengers during the year have been carried at an average rate of 3.82 cents per mile, which is not an excessive rate, since the average cost of performing the service has been 3.55 cents per mile.

Much other information might have been given here of value both to stockholders and to the patrons of the road, bearing on the question of competing rates and discrimination against local business, but its proper consideration would require more attention than can be demanded of those not specially interested in its proper exposition.

Enough has here been stated to show that, whether rates are too low or too high, whether a railroad is managed economically or otherwise, a correct opinion cannot be formed, nor one that is just to the responsible management, without a more careful consideration of the subject than most persons will give.

General Passenger and Ticket Agents' Association of Michigan.

At a meeting held in Chicago, Dec. 19, several articles of an agreement prepared at a previous meeting were ratified. The first clause requires ministers of the Gospel to sign a certificate to that effect before they are allowed half-fare tickets. The second authorizes the issue, in consideration of the publication of time-cards, of one season pass to each weekly newspaper and of one season pass to each daily paper and additional trip passes for reporters. Other clauses of the agreement are:

No passes to be issued to sheriffs, marshals chiefs of police or their deputies.

Stop-over checks to be limited to a time not exceeding ten days from date of issue, and one only and to but one point, to be issued on each ticket. Stop-over checks to be granted only on tickets sold at full rates, except that the Flint & Pere Marquette Railway may be allowed to issue stop-over checks on summer excursion tickets at any point west of the Saginaw River, and the Grand Rapids & Indiana Railroad the same privilege north of Big Rapids, and the Michigan Central north of Bay City.

The rate for all public gatherings, where rates are given, to be two cents per mile each way, and round trip excursion tickets only to be issued on certificates for identification, which are to be taken up by ticket agents and returned with their reports. Nothing in this to be construed to interfere with the usual half fares for 4th of July excursions, State Fair and Petoskey camp meeting.

That the rate for children between the ages of five and twelve, traveling on what is known as summer excursion tickets, may be one-half of the full rate, provided always that said half-rate shall not be less than one cent per mile each way, and to apply only on coupon tickets.

That, at the times of the vacations of the colleges located on the several lines, within the State of Michigan, excursion tickets may be issued to students to local stations at two cents per mile each way.

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Editorial Announcements.

Passes.—*All persons connected with this paper are forbidden to ask for passes under any circumstances, and we will be thankful to have any act of the kind reported to this office.*

Addresses.—*Business letters should be addressed and drafts made payable to* THE RAILROAD GAZETTE. *Communications for the attention of the Editors should be addressed* EDITOR RAILROAD GAZETTE.

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

RAILROAD APPORTIONMENT SCHEMES.

IV.

One of the youngest, but already the best known of the plans for dividing traffic now in successful operation, is what we will call

THE NEW YORK CITY APPORTIONMENT.

This affects what at first sight seems to be a very simple traffic, being that shipped from the New York receiving stations of the four trunk lines (New York Central & Hudson River, Erie Railway, Pennsylvania Railroad and Baltimore & Ohio Railroad) to the West, including nearly all traffic consigned to Buffalo, Dunkirk, Salamanca, Pittsburgh, Wheeling and Parkersburg, and over roads west of these termini of the trunk lines. The number of competitors is small, but these four lines are not the only carriers of freight from New York. While navigation is open the canal boats are ready to take freight for much less than the railroads will accept, and they get a little, though but a little merchandise proper. Then the Chesapeake & Ohio Railroad is in the market as a carrier to the West, sending its freight by steamer to Richmond, by its road thence to the Ohio, down the Ohio to Cincinnati, or elsewhere, and distributing thence. It takes freight always at less than the all-rail rates, and gets some, but not enough to make much impression on the business of the trunk lines.

There is hardly any traffic anywhere in the world for which the competition is likely to be fiercer than that for these shipments of merchandise from New York, due to the unavoidable great excess of the supply of transportation over the demand. This over-supply is not due to the excessive number of roads, but to the great disproportion between the east-bound and the west-bound traffic. The consignments to New York are chiefly raw materials or coarse products whose weight is considerable as compared with their value, such as the different kinds of grains, flour, cattle hogs, provisions, lumber, etc. The shipments from New York are largely dry goods, groceries, and other manufactured goods, worth much more per pound than the average of the freight received at New York from the West. There is probably an approximate equation between the values of the shipments in the two directions, but not at all in the quantities. Such of the railroads as report show usually three to four times as many tons of freight coming east as go west. It is therefore inevitable that out of four cars hauled west for produce, three at least must go empty. It is the struggle to get something to put into these empty cars that is the chief cause of the frequent railroad wars over shipments westward. The number of empty cars would be the same, of course, if there were but one road to carry the freight, and that one road would, if wise, accept extremely low rates for freight which it could not otherwise get,—rates less than the average cost of hauling even. Its expenses would be very little increased by putting loads in the cars which in any event would have to be hauled back to the West. But it so happens that the greater part of the west-bound traffic is not of a nature to require low rates. Indeed, with this freight are included the most valuable commodities, whose prices are affected very slightly indeed by the highest rates for transportation that have been charged for many years. Salt, iron, and some such articles are an exception, and the number of such articles increases with the development of manufactures in the West, where the cost of transportation serves as a protection, to some extent, against the competition of Eastern manufacturers; but a very large proportion of the shipments of New York have to meet only the competition of other seaboard cities, and not that of Western manufacturers. The business is not increased by the reduction in the transportation rates, if such reduction extends to other cities also.

Now in spite of this fact, which is generally acknowledged, that the west-bound traffic is not sensibly increased by low rates, west-bound rates have been for many years lower than the east-bound rates, which fall upon much less valuable freight; and wars of rates have been much more frequent over west-bound than over east-bound business. Indeed, hardly a year has passed that agreed rates were firmly maintained, and frequently the period of "cut" rates has lasted the better part of the year. When the last compact was made, the agreed rates were extremely low, as the following comparison of east and west-bound rates between Chicago and New York will show:

	1st class.	2d class.	3d class.	4th class.	Special.
East-bound	$1 50	$1 10	$0 85	$0 35	$0 30
West-bound	0 75	0 70	0 60	0 45	0 35

Those who maintain that the charges for transportation should be strictly in proportion to the cost will find this a most irrational tariff. It certainly costs as much to haul a car from New York to Chicago as from Chicago to New York, and if the west-bound traffic had to pay the entire cost of running the trains west, the average west-bound rate should be more than three times as high as the east-bound rate. The tariff is still more irrational if the value of the goods be considered the basis of the charge for transportation. The fact is that no principles of this kind have had much to do with the rates, which have been for so long a time kept down below what was reasonable by the efforts of companies to get business away from each other that it became impossible to restore them when the struggle ceased.

It seems to us that the citation of the rates charged on west-bound traffic is sufficient to prove the excessive competition for this business. The traffic which could not be increased by low rates has been carried for much less than the east-bound traffic, which can be largely increased by reducing the rates. The former did not bear its fair share of the expense of conducting the business and of the interest on the capital invested in it.

After the close of the memorable trunk line war of 1876, which extended to freight and passengers in both directions, and was not so exceptional with regard to west-bound as with regard to the more important east-bound freight, those in authority seem to have been so impressed by the power for mutual injury developed by their dissensions that they desired to test the power for mutual benefit that might result from their combination. The settlement of the troubles of 1876 required many meetings, and the managers were brought together more frequently than usual. The conflict had been disastrous to them all, and none was in condition to have it renewed. Indeed, fear lest it might be renewed was probably a cause why the companies were unusually ready to make concessions, and establish agreements on a basis which might be lasting.

The differences in the rates from the different sea-board cities had been agreed upon before any negotiations concerning an apportionment of New York business were had; but some time last Spring the division of the business of the four trunk lines out of that city was suggested and, after several meetings, was agreed upon. The agreement, in the first place, was little more that a contract to give each line a certain proportion of this total traffic, not much regard being had to the means by which the agreement should be carried out; but modifications were afterwards made at the suggestion of Mr. Albert Fink, whom the managers wished to take charge of the execution of the plan, and whose valuable experience with the Southern Association as well as his thorough study of the subject especially fitted to develop a plan of operation as well as to execute it. The companies, however, had already determined what should be done. The shipments to the several competing points were to be distributed among the few lines in certain proportions, substantially equal for the three roads which have termini at New York, as the Baltimore & Ohio depends upon the Pennsylvania Railroad for its rail connection with New York. The New York Central & Hudson River was awarded 33 per cent., the Erie 33 per cent., the Pennsylvania 25 per cent. and the Baltimore & Ohio 9 per cent. of the total, with the exception of freight to the Union Pacific, which was divided equally among the four roads. And they were to have the freight—not an allowance for the profits on it, but the goods themselves. When shippers had brought to one company during a given period more than its proportion of freight, freight was carted from its stations to those of the companies which have received less than their proportion until the agreed distribution was made.

This may seem a simple enough operation, but it is less so than appears at first. In the first place, the number of points to which traffic is sent is very large, and in order to satisfy the connecting lines it is necessary to divide not simply the total traffic offered at the New York stations without regard to its destination, but also to have some regard to the division of the traffic consigned to each competing point.

Again, the allotment requires that each road should get its proportion of each class of freight—of which there were five when the plan went into operation. The chances are therefore very great against any one's getting its proportion of the traffic in such a way as to obviate the necessity of transfers from one road to another. One may have its exact proportion of the total traffic, but too much of one class and too little of another. And the distribution of the classes is of great importance, the difference in rates being very great and in profits still greater. If the object of the apportionment was chiefly the division of the gross earnings from the traffic, the adjustment could be made on this basis, without regard to classes, two tons at a 50 cent rate being made to balance one ton at a 100 cent rate; but the profits are usually much the largest on the high class freight, and as we have said before, the connecting roads in the West have interests which the trunk lines cannot neglect, and, moreover, it could not be taken for granted that the agreement would last forever. It was only prudent to have the business so conducted as to leave each road in a fair condition to resume business independently should the apportionment ever be abandoned. This would not be the case if one line should secure an undue proportion of the high class and more desirable freight or of the traffic at a place where business was rapidly increasing.

The basis of the agreement for the division of business seems to have been the assumption that lines with termini in the city and approximately equal advantages for carrying freight, taking the whole field together, would, or at least could, secure approximately equal amounts of traffic. The rational method of arriving at a basis would seem to be by a comparison of the proportion, obtained by the competito during a series of past years while working under normal conditions—with agreed and equal rates. But no one seems to have been able to supply definite information under this head, or perhaps it would be nearer the truth to say that periods of agreed and strictly maintained rates had been too few and short in the history of west-bound traffic from New York to afford material for safe deductions. And for two years before especially the course of business had been such that the results were no criterion of the natural division of business. In 1876 almost the first step taken in the long-continued contest of that year was the diversion of the customers of certain companies by another, which usually secured them not merely by offering lower rates than had been charged, but also and chiefly by contracting to carry for them for a long period (usually a year) at ridiculously low rates on condition of getting the whole business of such customers. Of course the party who first takes the field with this policy has a great advantage, so far as getting traffic is concerned. For the year in question the Pennsylvania Railroad, it is said, was virtually out of the market, refusing the contract to carry for the price offered by other companies. Thus the distribution of traffic actually occurring just before the New York agreement was made could not fairly be taken as the basis of an apportionment for the future.

The machinery of this combination consists of a central office in charge of a Commissioner, to whom are made daily reports of all the freight of every class received at the several stations (each company in New York has several), with the destination of each shipment. A press copy of each way bill is sent him, and also a daily abstract of these way bills. At his office these reports are recorded and tabulated, so that the exact amount of freight shipped daily by the four lines is ascertained—the basis of the distribution. Daily reports are made, in return, by the central office of the total shipments of the day and the proper proportion of each road. At the end of each week instructions are given as to the balances which must be transferred in order to make the required apportionment, if these balances are considerable, and orders are given accordingly. The

transfers are made by carting from one station to another at the expense of the party to whom the freight is transferred. The receipts given for freight reserve the privilege of forwarding it by any railroad route. As each road knows daily how much freight is due from it or to it, the transfers can be managed very much at its convenience. If the balances are small, it is better to wait and see if they will not be cleared by the shipments of following days; and when a considerable balance has accumulated, transfers can be made gradually from the freight received for some time afterwards.

The central office becomes virtually a clearing-house of freight, collecting no money, but keeping complete statistics of the freight, the amount of each class delivered by the shippers to each company, with its destination, the amounts actually moved by each road, and also its distribution among the railroads west of the trunk lines.

It is with regard to this latter distribution that the greatest difficulties have been met. The apportionment is made by a contract among the four trunk lines, and wholly for their benefit, without the co-operation of their Western connections. We may regard the trunk lines as indifferent to the distribution of the traffic after it leaves their own roads at Niagara Falls, Buffalo, Salamanca, Pittsburgh, Wheeling, or Parkersburg. But the trunk lines cannot make any distribution of business without limiting the amount which their connections can obtain. Let us suppose, for instance, that the entire Chicago business of the New York Central and the Erie roads is carried by the Great Western of Canada and the Lake Shore & Michigan Southern, and that the latter roads get no Chicago traffic from the other trunk lines. Now the two last named roads have agencies in New York to secure freight. Let us suppose that they together secure 80 per cent. of the total shipments from New York to Chicago. But the contract of the four trunk lines allots but 66 per cent. of that traffic to the New York Central and the Erie. These roads therefore must refuse to deliver to their two western connections part of the freight which the latter have solicited and obtained, unless they can make up the excess to Chicago out of shipments to other points. Actually there are several western connections of the two roads from New York to Buffalo, and the latter virtually put a limit to the amount of freight they will give these connections. Their share of the freight and no more can be divided among their connections. Before the traffic reaches its destination at Mississippi or Missouri River points it becomes very much divided, but it is still eagerly sought by many of the Western roads, whose managers have not always been willing to see traffic which they had worked hard for at considerable expense given to some competing line—perhaps as far off as the Ohio & Mississippi is from the Chicago & Alton, both of which compete for the freight carried from New York to St. Louis.

It was not long after the apportionment began, which was July 1, that complaints were made against connecting roads. The matter was considered at several conferences of managers, and it became plain that a division of traffic among the trunk lines virtually involved a division among their connections. Efforts have been made to have these connections agree to such division, but it is only in the case of the St. Louis traffic, we believe, that an agreement was reached, though the difficulty seems to have been solely as to the proportions to be awarded the different lines, and not at all as to the advisability of some division by agreement. In default of an agreement, the trunk lines have divided the traffic among their connections on their own responsibility, allowing it to take its own course, however, so far as possible, the Commissioner serving as arbitrator as in other matters when differences arise. Latterly, we understand, complaints of the distribution have virtually ceased, the roads accepting what is allotted them cheerfully, though not acknowledging that their proportion is all that is justly due them. They know very well that their profits are much greater as the business is now conducted than they would be if there was no apportionment and the business was conducted as usual heretofore.

The only other serious difficulty which the plan has encountered has been concerning a proposed change in the proportions of the different roads. The original division seems to have been provisional, or so considered by some of the parties to the contract, subject to revision if experience should show it to be unfair. It is reported that the New York Central & Hudson River Company received from shippers a much larger proportion of the New York freight than the 33 per cent. awarded to it; and that, moreover, its surplus was largely in receipts of first-class freight. On the other hand, however, it was claimed that the exceptional circumstances preceding the apportionment tended to give it more than its average proportion, and could not be expected to cease to operate for some time, and that greater exertions were made to get traffic for it than for other roads; while the Baltimore & Ohio claimed that though without making any exertions it was not likely to get as much business as the contract allotted it, still, if it should cultivate its New York business as it would were it free to take all it could get, it would get much more than was allotted it, and it also claimed an increase of its proportion. This question was never concluded, the companies being unable to agree, and apparently preferring to wait for further experience. It will doubtless be very difficult to make any line accept a smaller proportion than it is now getting, and a dispute on this subject is more likely than anything else to destroy the combination. But for some time the feeling seems to have been general that the advantages of the agreement have been enormous, and that it will have to be a very serious injustice that will excuse its dissolution.

The information obtained and recorded in the Commissioner's office is of very great value, and will serve many other purposes than that of the simple apportionment out of New York. Rates being strictly maintained and the traffic being left to distribute itself as it will among the connections of the trunk lines, so far as is compatible with the agreement, the records kept will show the proportions of business which each of these connections get under normal circumstances, and will thus serve as a basis for an agreed division among these connecting roads, should they desire to make one, as probably they will. This is a complicated matter. The trunk lines cannot manage the division so as to get the agreed proportions of the shipments to every point of destination —only of the total shipments from New York, and perhaps of those to some of the leading Western traffic centres. Some of the places covered by the agreement are not served by all the roads. Buffalo, for instance, gets no freight by way of the Baltimore & Ohio, and but little by the Pennsylvania. The shipments to Pittsburgh are substantially divided between the Pennsylvania and the Baltimore & Ohio, and the two last named roads carry very little traffic for Western Canada and Eastern Michigan. Evidently one road may have greater advantages for serving one place than another. The Baltimore & Ohio, for instance, is a short line to Cincinnati and a very long one to Cleveland. The New York Central is a long one to Cincinnati and a short one to Cleveland. It is manifestly better for both that they get, so far as possible, their proportion of the total traffic in consignments to places to which they can carry at least cost and therefore with the greatest profit, as the rates are the same by all routes. Some other influences than the mere cost, however, affect the interests of the company in the traffic to particular places. The Baltimore & Ohio, for instance, has a long route from New York to Chicago, but it is all its own road, and it may prefer to make a small profit per mile over 800 miles of road than a larger profit per mile on a shipment which does not go more than half as far over its road. The companies, too, are specially desirous to be well established at places where there is a great and growing traffic, as at Chicago. Still there is a considerable portion of the freight which can be carried at much less cost by one route than by another, and the records now kept will make it possible to know how much of such freight there is, and how it can be distributed to the best advantage of all parties concerned. This distribution among the cheapest routes would seem to be the most rational of all, and perfectly practicable, and so it would be but for the interests of some of the connecting lines. If the two New York roads should agree to give up the entire Cincinnati business to the shorter roads in exchange for a corresponding amount of traffic in which the former could make greater profit, they would deprive the roads which carry between Lake Erie and the Ohio River of a large part of their business. Evidently the whole business to each place cannot be given to the route which can best do it without some agreement for the distribution of the profits of competitive traffic among all the roads capable of carrying it, somewhat in proportion to their ability to earn profits from it. This, however, belongs to a later stage in the development which it would perhaps be idle to attempt to anticipate, but to which the plans now in operation may in time lead.

As in the Southern Railway and Steamship Association, the central office with its chief officer, the Commissioner (Mr. Albert Fink), has been of the greatest value, not simply as indispensable to collect, compile and distribute the information which is the basis of the apportionment, but as a "clearing house of opinions" as it has been called, through which negotiations could be conducted and differences arbitrated. In fact the whole plan has worked so smoothly that some may have concluded that there were no difficulties connected with it, and that it would substantially "run itself." Only those who know the difficulties avoided and the agreements effected through this organization, and the very serious effects that have frequently heretofore resulted from slight differences, will fully appreciate this feature.

This combination of the trunk lines has nothing whatever to do with east-bound business, or with shipments from other places than New York, though it is part of the agreement that rates shall be maintained at the other ports. The conferences that have been held with the western connections of the trunk lines with regard to the distribution of west-bound business have sometimes been held at the same time as other conferences regarding maintaining rates on east-bound freight, and in this way some have received the impression that the New York apportionment agreement exercised some kind of supervision over traffic in both directions. It has doubtless suggested the making of some agreement concerning east-bound freight, but it covers only the business we have described. It seems now in a fair way to have a long life. All the parties to it have been greatly profited by it, and the public has had no reason to complain. Its effect is, of course, to do away with the necessity for the expensive machinery for soliciting traffic maintained in the City of New York by all the trunk lines, most of the fast freight lines and many of the connections of the trunk lines, but as yet we believe that none of them have been discontinued. This indicates that the parties to the agreement are not so sure of the continuance of the arrangement that they think it prudent to abandon their organizations for securing business in the ordinary way, and perhaps no step of this kind could be safely taken until the connecting roads, as well as the trunk lines, have agreed to an apportionment. Apparently all parties will be well enough satisfied the first year by the increase in the receipts from this New York traffic, without endeavoring to reduce the expenses in connection with it.

Record of New Railroad Construction.

This number of the *Railroad Gazette* contains information of the laying of track on new railroads as follows:

Emlenton & Clarion.—Extended from Shippenville, Pa., to Clarion, 8 miles. It is of 3 ft. gauge.

Des Moines & Minnesota.—Extended from Ames, Ia., northward to Story City, 10 miles. It is of 3 ft. gauge.

Southern Pacific.—The *Los Angeles & San Diego Branch* is extended from Anaheim, Cal., southward to Santa Ana, 7 miles.

This is a total of 25 miles of new railroad, making 2,019 miles completed in the United States in 1877, against 2,278 miles reported for the corresponding period in 1876, 1,333 in 1875, 1,844 in 1874, 3,630 in 1873, and 7,160 in 1872.

THE BROTHERHOOD OF LOCOMOTIVE ENGINEERS reports in its December *Journal* the expulsion of 364 members, of different divisions, for "non-payment of dues." Usually there are very few such expulsions noted, and the inference is that a good many members are dropping the Brotherhood. The unsuccessful strikes on the Boston & Maine and the Reading probably has caused some disaffection, as they have cost the members something for their contributions to the strikers, and most people are easily disheartened when they do not succeed in effecting what they work and pay for. But aside from this, there is doubtless a strong feeling against the Brotherhood among people who have nothing to do with railroad business, part of which is due to the strikes last winter, which were ordered by the Brotherhood, but most of which is owing to the great strike of firemen and brakemen last summer, with which the Brotherhood had nothing to do. The average man, however, does not study these things very closely. The first strikes of railroad men, some successful and some not, were made by the Brotherhood, and the community learned this fact so well that it took it as a matter of course when there were other and more serious and general strikes that the Brotherhood was at the bottom of them. The engineman is likely to look at the society in a very practical way, and balance its disadvantage against its advantages, and when he finds that his employers, or a very large part of them, would like him better if he were not a member, and that some people look upon the Brotherhood as an instigator of riots and arson, these facts certainly weigh against the advantages. There has been some talk in the newspapers of the disbandment of sundry divisions; but no mention of such a proceeding has been made in the Brotherhood's *Journal*, which publishes every month a list of the divisions, with the names of the officers of each and its place and time of meeting. Nos. 1 to 192 stood intact in the December *Journal*. The expulsions for non-payment of dues, however, indicate that some divisions have at least become very weak. From No. 139 (Houston, Texas) 18 are expelled; from No. 71 (Philadelphia), 13; from No. 10 (Chicago), 17; from No. 20 (Richmond, Ind.), 9; from No. 45 (West Philadelphia), 21; from No. 97 (South Baltimore), 27. This looks like a wholesale abandonment of some of the divisions, and indicates a considerable and widespread disaffection.

STEAM STREET ENGINES seem to make more progress in Brooklyn than anywhere else. As we have said, hitherto steam has been used little except on routes which were largely suburban, but now the Railroad Committee of the Brooklyn Common Council recommends that its use be permitted on two lines wholly within the city, and nearly their whole length in populous streets, though there is not a heavy movement of vehicles in them. One of these routes is from Hamilton Ferry to Third avenue and Twenty-fourth street, which is simply an extension of the present steam line from Twenty-fourth street to Fort Hamilton; and the other is the line from Hamilton Ferry to the Prospect Park & Coney Island Railroad station at Ninth avenue and Twentieth street. The trial of steam on these routes would serve very well to test its effect on residence and business streets; but the Committee recommends one condition of the use of steam which seems altogether unreasonable. This is, that the companies shall pay to the city one cent for each five-cent fare and half a cent for each three-cent fare into the city treasury. As the change will put the city to no expense whatever, this is certainly an enormous tax to impose upon this business—amounting to about 20 per cent. of its *gross receipts* and to more than the *total* net earnings of the

Brooklyn City Company's railroads in 1876. The committee, then, seems to assume that the adoption of steam will enable the company to more than double its profits; otherwise it would have no inducement to accept the permission coupled with the proposed tax. But even if this amount of saving can be made, it is not proper to turn it into the city treasury. It might not be improper to require a reduction of fares, in case the reduction in expenses should reach a certain amount, or an increase in the accommodation of passengers, such as an increase in the numbers of cars run sufficient to give every passenger a seat under all ordinary circumstances; but to levy such an enormous tax as the condition of improving street car service will have the direct effect of preventing the community from getting the better accommodations which they so much need, and which the improvement was mainly designed to secure.

THE PENINSULAR & ORIENTAL STEAM NAVIGATION COMPANY, which is the greatest of steamship companies, had by its recent report 45 steamers engaged in commerce with an aggregate capacity of 117,478 tons, and an aggregate horse power of 20,015, or an average of 2,610 tons and 445 horse-power per steamer—about six tons capacity to one horse-power. Besides those steamers which are engaged in traffic, the company has 17 steam tugs and launches. This company has been in existence thirty years, during which time considerable changes have occurred in its traffic, in marine engineering, and in the requirements of its vessels. Most of its fleet is now provided with compound engines, the work of substitution having proceeded for many years. Latterly it has sold its smaller vessels, when possible, and has replaced them with large ones. The one now building is of 4,200 tons, and will be the largest in its fleet. This, it is reported, is due to the fact that only recently have heavy freights been taken by steamers. Formerly it was assumed that all coarse goods would go by sail, and that the chief business of steamers would be carrying passengers, mails and costly goods. The average value of the fleet is reported to be about $125 per ton, making its aggregate value less than $15,000,000. As this is the greatest of steamship companies, this is a striking illustration of the vastly greater capital invested in railroads. One hundred miles of average railroad in the United Kingdom represents considerably more money. The profits of the last year were about $670,000, or $14,890 per vessel, $5.70 per ton of capacity, and $33.50 per horse power, which is equivalent to 4⅝ per cent. on the company's capital. This company finds it necessary to charge not less than 5 per cent. of the cost of its vessels as the yearly depreciation. Like American railroads, it complains of low freight rates, that from Bombay to Liverpool and the Continent averaging not much over 30 shillings per ton for the last six months, which is equivalent to about 20 cents per bushel for wheat. This is about a third or a quarter more than the current rate from New York, which is but half as distant. We have before called attention to the low rates from San Francisco to Great Britain, and it seems now that distance by sea is but a slight obstacle to commercial exchanges anywhere in the world where traffic is large.

THE WINTER GRAIN BUSINESS, according to the returns for the two weeks after the substantial close of navigation, is very good, though much lighter than when navigation was open. For the last week reported (ending Dec. 15) the quantity forwarded from Northwestern markets was, it is true, less than for the corresponding week last year (1,170,719 bushels against 1,380,152), but it was nearly 60 per cent. greater than in 1875, and 84 per cent. greater than in 1874. We must remember that last year the grain was carried after navigation closed at rates on the basis of 20 cents per 100 lbs. from Chicago to New York or less, while now the basis is 40 cents per 100 lbs. Last year the cost of transportation was as low, substantially, in the winter as in the fall. The small stocks accumulated at the Northwestern markets and the bad condition of roads preventing free arrivals have tended to reduce the quantity forwarded, and with the return of freezing weather and solid roads there is reason to expect an increased movement, as there is no question as to the enormous quantities in the farmers' hands waiting to come forward. And they have this inducement to forward this winter rather than wait until navigation opens, that now the Black Sea is closed, and the Russian supply is substantially cut off from the British market, while it is at least possible if not probable that by the time that navigation is opened on our lakes and canals the war may be ended and the great Russian harvest be as accessible as ever it was.

The effect of the closing of navigation on the receipts at Atlantic ports is also what was to be expected. The arrivals at New York for the week ending Dec. 15 were not one-fifth as great as for either of the last two weeks of November, but the arrivals at Philadelphia and Baltimore were larger, and considerably above their average during the season of navigation. New York's proportion, however, was nearly as great as for any week while navigation was closed last winter after the 1st of January, and greater than its average then, and the quantity was considerably greater than it received during any week from the 1st of January to the middle of April. Last year, during the 17 weeks from Jan. 1 to April 28, Baltimore received more grain than New York (30.6 against 29.5 per cent. of the total). Last year's division of traffic was made chiefly or largely on contracts made in the summer under a policy which aimed to give New York as low rates as Baltimore, though of course there was and is no way to secure this except by carrying for nothing.

The winter rate last year was nominally much higher than the summer rate, but it is understood that pretty much all the grain was actually carried on old contracts at summer rates. It is easy to see, therefore, that a larger grain business than last year means more than double last year's gross earnings from grain and many times as great profits from grain traffic.

THE RED RIVER OF THE NORTH appears to be a more important member of the American transportation system than most people have imagined. Its head of navigation is at Breckenridge, whence it is reached by the St. Paul & Pacific main line, but it is crossed some forty miles further down at Moorhead by the Southern Pacific, and reached about eighty miles still further down (north) by the St. Vincent Branch of the St. Paul & Pacific. At a recent convention held at Breckenridge it was stated that seven American steamers ply on this river, and on its connecting waters north five Canadian steamers and one ocean propeller, the latter running across Lake Winnipeg, 300 miles, connecting the Red River navigation with steamers on the Saskatchewan, making a water route 2,000 miles long from Breckenridge. During the past season these steamers are said to have carried 9,600 passengers and 14,000 tons of freight—not at all a heavy traffic—but there was also some freight carried by flat-boats and barges. The most desirable wheat lands of the Red River valley are nearly all within easy hawling distance of the river, which naturally might be supposed to suffice for the accommodation of the country until it has a much greater population than at present. But it is a small stream, and the vessels on it are of moderate capacity, and of course can run only a small part of the year. So, as we have seen, about 100 miles of railroad were built some time ago parallel with the river and but twelve or fifteen miles east of it, and preparations have been made to extend this road south to the St. Paul & Pacific and north to the Manitoba border. The Canadian colony is said to grow quite rapidly, and the good crop of wheat last summer has encouraged purchases of land on the American side, mostly near the railroads now in operation, which have a great interest in the settlement of this valley and the country further north.

EAST-BOUND TRAFFIC appears to be in an unsatisfactory condition, in spite of the meeting last week and the appointment of a Commissioner to exercise some kind of supervision over that traffic. This would make it appear that an agreement had been reached, and that future trouble would be avoided unless some difficulty should be met in executing the agreement. But as we understand it no agreement was actually effected, two of the most important companies distinctly declaring that they would not be bound by the action of the meeting. Under these circumstances we do not see what the new Commissioner, Mr. Guilford, well known as General Freight Agent of the Baltimore & Ohio Railroad, can do that could not have been done by any of the companies without him. Under the agreement of last October the trunk lines were to charge local rates on freight received from connections which should cut the east bound rates that might be agreed upon, on application. An executive committee was then appointed to see that the agreement was duly observed, but if rates have been cut as is charged, and as seems to be admitted, this committee seems not to have done its duty. Apparently the new Commissioner will take the place of this executive committee to some extent, hearing and investigating complaints, and reporting when a delinquent should be punished. If all the companies were agreed and would report regularly to such an officer, he might collect most important information, which would be of great value in settling disputes that may arise hereafter, but if any important companies stand aloof, the value of his labors must be greatly limited. At best it is extremely difficult to enforce an agreement to maintain rates unless it is accompanied by a further agreement to so divide business as to take away all motives for cutting.

COMPENSATION FOR INJURIES TO RAILROAD EMPLOYES is now asked by the British Society of Employes, which urges the subject on the public and Parliament with much pertinacity and vigor. The recent "Royal Commission on Railway Accidents" considered and reported on the subject, and recommended a change in the existing law, but not to the extent asked by this society. Its Secretary puts the men's demand in the following terms: that "where personal injury is caused to a railway servant by reason of *defective works, plant, or stock of a railway*, or by reason of the negligence of any person of superior grade in the service of the railway company, or by reason of the negligence of any person to whose orders, directions or signals the servant is bound to conform, the servant (or, in case of death, his relatives or representatives) shall have the same right of compensation and remedies against the railway company as if he had not been the servant of the company."

THE PACKING SEASON, though very unfavorable so far as weather is concerned, has still afforded a heavy traffic in hogs and products, though a trifle less than last year. Chicago easily keeps its lead as the headquarters of the packing business. Indeed, this year it has so far had nearly one-third of the total business, and in a single week it has received nearly 308,000 hogs, which is more than the total season's (four months') packing of any other city except Cincinnati and St. Louis. There are seven cities where there is a large packing business, these seven last year packing 66¾ per cent. of the total put up for market in the Northwest. The percentage of the total packed at each of these cities during the last packing season was: Chicago, 31¼; Cincinnati, 10¼; St. Louis, 8⅛; Indianapolis, 5¾; Milwaukee, 4½; Louisville, 4¼; Kansas City, 2¼. Chicago thus packed three times as much as any other city.

THE GRAND TRUNK RAILWAY has asked another loan, which is to be in the form of debenture stock to the amount of £300,000, or $1,500,000. This, however, will not be wholly an addition to the present enormous capital account, for £100,000 of it will go to pay off that amount of first equipment 6 per cent. bonds, and £76,027 to retire Montreal & Champlain 8 per cents., these being obligatious which have always been met. The interest on these old obligations is £12,000 and more, and as the new issue bears but 5 per cent., the addition to the annual charge will be less than £3,000. The company's net earnings for the four months ending with October are reported to have been about 20 per cent. greater than last year. Even for this exceptionally profitable period, however, the average earnings per mile were only at the rate of $160 per month.

The Rock Island Bridge Accident.

The recent accident, by which one span of the bridge over the Mississippi at Rock Island, Ill., was knocked down, is thus described by the Rock Island *Union* of Dec. 16:

"At 8 o'clock yesterday morning, locomotive No. 71, with freight train No. 7, 28 cars, Conductor McFarland, was going north over the bridge on the Chicago, Rock Island & Pacific Railroad, the last car being a wrecking car which had been taken to the company's shops in Chicago and rebuilt. When leaving Rock Island, Conductor McFarland had remarked that it seemed to him that the derrick stood higher than before it was rebuilt. His supposition proved correct, various estimates, after a disaster which took place soon afterward, showing that the derrick boom was at least eight inches too high to pass under the upper structure of the portal leading on to the island shore span of the bridge. This is the span which stretches over the space between the railroad embankment and the draw span, over the entrance to the main avenue on the island. It is 100 feet long and is constructed with eight panels.

"The locomotive and 25 cars had passed over the span. The twenty-seventh car was the caboose. A few men were inside it, but Conductor McFarland was on the top, looking at the derrick car, to see how near being too high for the upper structure of the portal it was. Just then the boom of the derrick proved its superabundant altitude by striking the middle of the end strut of the span—a double beam of iron which extends between the tops of the posts of the portal and holds them apart—and bent it in horseshoe fashion. This naturally permitted the strength of that portion of the upper work which the strut held in position to pull the posts inward and allowed the sections of the top chord to drop out of place. As soon as this happened, there was nothing to hold up that end of the span and it fell from the embankment pier 13 feet to the road below, taking with it the three last cars of the train—a box car, caboose and the derrick car. There was a loud crash, but the men in the caboose say they went down easily and were but little shaken. Conductor McFarland, however, fared differently. Those who rushed to the scene found him lying on the sidewalk of the deck of the fallen span, unconscious, bleeding profusely from shocking cuts in his head, and evidently badly injured in other respects. * *

"Of the eight panels of the span, the three at the end which struck the ground were bent and twisted in all sorts of shapes; but, in the other five panels, not a bolt was bent or broken, or even the paint cracked or marred. * *

"A derrick was quickly rigged and the box car and caboose were got out of the way, but it was evening before the derrick car was lifted off the wreck. Work went on after dark. The five sound panels are to be raised by powerful hydraulic jacks and the place of the three others supplied temporarily by trestle work, which will be put up in such a way that it can be used as false-work for rebuilding. Only the three broken panels will have to be replaced and pieced on to the other five, to make the span of its original strength and solidity. The temporary repairs will be completed to-morrow morning and trains will pass over the bridge as usual in the afternoon.

"The blame for the accident, of course, rests with the official of the railroad company whose duty it was to consult his record of the height of every bridge upon the road, and see that no derrick car or any other car goes out of the shops that will not pass safely under every bridge."

Discriminations in Favor of Large Shippers.

In the contribution of Mr. Albert Fink to the Report on Internal Commerce the following passage occurs:

Question 6. Please to state your views as to the propriety of the policy of a road entering into special contracts with parties proposing to erect large manufacturing establishments on the line of their roads to carry freight at less rates than for the public generally, the object being to wait for profits likely to arise from the general development of business in consequence of the erection of such works.

Answer.—I do not think that a common carrier has the legal right to enter into special contract with manufacturing establishments to carry freight at less rate than for the public generally, for the purpose of encouraging the erection of such establishments on the line of its road.

It is not the province of railroad companies to make themselves partners in private enterprises. Even if they had the legal right, it is questionable whether it would be good policy for them to do so.

The same articles of freight should be carried at the same rates between the same points. If coal is carried from A to B for a blast-furnace at B at a certain rate, it should be carried for the same rate for a party at B who consumes it in manufacturing flour. Both parties benefit the railroads, and it is impossible to draw a line of distinction and to grant privileges on account of the degree to which railroad companies may be benefitted by different shippers. Such policy would lead to many complications and unjust discrimination. Nor do I think it right that common carriers should make special contracts on account of the quantity shipped, except when quantity forms an element in the cost of the transportation service, and this is only the case when the quantities are less than car-loads.

It does not cost more to carry ten car-loads of freight between two station, A and B, for one shipper than it costs to carry one car-load for each of ten shippers.

The railroad company derives as much benefit from ten small manufacturing establishments as from one large one of the capacity of ten smaller ones.

If the railroad company grants to the larger establishment lower rates of transportation, it would unjustly discriminate against parties with limited means, and be of no benefit to the railroad company.

A common carrier should strictly adhere to the rule to charge the same rate for transportation for the same articles between the same points, only discriminating on account of quantity as far as it influences the cost of transportation. He should not make any arbitrary distinctions merely depending upon his will.

Discrimination in rates of transportation should be based upon conditions and facts which cannot be controlled by the railroad companies, and upon principles recognized as correct in all other business transactions.

Vindication of Mr. Job H. Jackson.

It will be remembered that some time ago, a Mr. Jackson, of Wilmington, Del., the President of the Jackson & Sharp Car Company, was arrested upon a warrant and brought to Georgia. The charge against him was swindling, and it was said that other charges would be preferred. Mr. Jackson tried to escape from Mr. Sheriff Wells, en route to Atlanta, and being rearrested in Washington, was handcuffed and brought to the city. He promptly gave bond, and returned to Delaware. On yesterday morning he returned to the city, accompanied by Mr.

Harrington, his counsel. They at once consulted Senator Benjamin H. Hill, who had already received a letter from Senator Bayard, accrediting Mr. Jackson as a man of high character, of great worth and standing. They laid the facts before Mr. Hill. According to their statement, Mr. Frink, who was formerly a clerk here in one of the departments, shortly after the reconstruction crash, wrote a letter to Mr. Jackson demanding $3,000 that he claimed was due to Mr. Kimball, and had been transferred by Mr. Kimball to him. Mr. Jackson replied that Mr. Kimball owed him much more than that amount, and that he would credit it on his account. Frink replied that the claim had been transferred to him, and that it must be paid. Jackson again refused to pay, and he claims that Frink then changed his tactics and determined to put Jackson to trouble. He made a transfer of the claim in some way or other to the State, and had it presented in the name of the State. No prosecutor appears in the presentment under which Jackson was arrested. It was a "special presentment," and Mr. Hill says if any responsible name could be connected with it, he "would make it very lively for him." Upon the statement of the facts, Mr. Hill was very indignant, and said that he blushed, as a Georgian, to think of the indignity that had been put upon a stranger in her name. He then insisted that Mr. Jackson should go with him before the Governor, and in the presence of the Attorney-General and others state the full facts. He felt certain that the Governor would do all in his power to vindicate his character and restore the integrity of the State's name. Early night before last they met the Governor, Attorney-General, and a number of others, and went over the case. Mr. Hill says that the Governor and all the gentlemen present were positively satisfied that great injustice had been done to Mr. Jackson. Yesterday the Governor furnished Mr. Jackson a letter, in which he stated that he felt sure that the prosecution against Mr. Jackson had been commenced under a misapprehension, and that while he had no authority to move in the matter, he would certainly advise that the case be nolle prosequied.

Mr. Hill says: "The treatment of this man was a piece of unparalleled barbarism. If it were known in all its details, it would make every Georgian hang his head in shame. It was a simple piece of kidnapping, done without the shadow of an excuse. It was a gross and unpardonable piece of oppression—a brutal and unmerited insult upon an honorable and high-toned gentleman. He does not owe the State one cent. The State, on the contrary, owes him $1,000. It is a shame upon the State that he has been treated as he has. The facts should be speedily put before the people, and we should all vie with each other in making reparation to this much wronged gentleman."—*Atlanta (Ga.) Constitution, Dec.* 23.

Ticket Printing in England.

It is now some forty years since railway tickets were printed and issued. The originator of the idea was a man who was employed at a wayside station in the neighborhood of Carlisle, and those he then used were about the same size as the tickets now issued. But his arrangements for printing them were of the most primitive description. In fact, a few types fastened together in a case about the size of a nail-brush formed his sole apparatus. The name of the station to which the passenger was going was written upon the ticket at the time of issue. We can realize to ourselves how this system would work now—say at Clapham Junction or at the Underground stations. But this system, primitive as it was, grew and flourished and became the parent of the present one. The use of tickets on this principle gradually increased until at last its inventor found that it would be desirable to devote himself entirely to the development of the new industry. From that day to this the printing of railway tickets has remained in the hands of the same family, who have pursued it with an amount of perseverance and ingenuity perfectly marvelous. The railways of nearly the whole world are supplied with tickets from the one manufactory. There may be seen in course of manufacture tickets for English railways, Swedish, South American, Egyptian, etc. We saw there on one occasion Cairo tickets—a special class—for "pilgrims going to Mecca," and others for a fourth class, specially printed for a South American line, "for slaves without shoes and stockings."

The first great improvement made in the tickets was in numbering them. This was an enormous stride in advance of the old tickets. Every railway passenger has noticed that each ticket is numbered, and many people imagine that that number is printed by the little press in front of the ticket clerk when he thrusts the ticket in before it is issued. But the duty of that press is in reality to print the date—the numbering being done before the ticket arrives at the station. A large proportion of the accuracy of the accounts of railways depends upon these numbers. For example, take the case of a booking clerk at Reading. He had before him a box with a large number of pigeon-holes, each holding the tickets for one station. Let us select the pigeon-hole for Salisbury. Before he begins his day's work he knows that the first ticket from Reading to Salisbury will be say 5,026. When his day's work is over, he finds that the last ticket issued is say 5,056. He has therefore issued thirty tickets of this particular class to Salisbury, and is responsible for thirty fares. He has a return to fill up each day of the numbers on the tickets issued, and by seeing that the last number on each day and the first of the next are consecutive, the officials at headquarters are able to have a complete check upon the station clerks, and to preserve an almost invariable accuracy in their accounts. Let us see how this ticket printing is done. First of all, here are boxes filled with colored pieces of cardboard, which will soon be printed and made into tickets. An order has come from the Southwestern Railway for so many thousand tickets from say Waterloo to Bishopstoke. The order states color or colors, the number of the last ticket in stock, and the average consumption, which enables the printer to know when the tickets ordered must be sent in. The little steam-wrought machine for printing railway tickets is an exceedingly ingenious piece of mechanism. Imagine a table about twice the size of a page of this magazine, with a long, thin box rising above it at the back, and another box falling below it at the front. The table contains the printing rollers and type case; the boxes (the interior horizontal section of which is the size of a ticket) are for holding tickets. The upper box is filled with a pile of pieces of cardboard. One at a time, the lowest card is jerked by a spring under the printing machinery, and falls into the lower box; and in less than a quarter of a second it is printed and numbered and safely stored in the other box. All that the man has to do is to keep the upper box filled with cards, remove the lower box when filled, supply fresh empty boxes, place the printed tickets in rows, and see that the ink reservoir is full. The machine does the rest, including the printing, the inking of the type, and the moving and storing of the tickets. The numbering is done by means of four wheels, with their centres in a horizontal line—thus forming a cylinder. These wheels have raised numerals on their edges, which imprint themselves on the tickets. The wheel which bears the numeral in the units place, moves so that a fresh type is ready for each successive ticket; that in the ten's place, at one-tenth that rate, and so on. The next step, of counting the tickets, is a curious one. Though the greatest care is taken to insure accuracy, mistakes will occur in printing the numbers on the tickets. Sometimes a number is omitted; sometimes two tickets are printed with the same number. To provide against such casualties the tickets when printed are counted; and as it is impossible for human eye and memory and judgment to be infallible, they are counted by machinery. This machinery again consists of a table with two boxes as before. This time the table is simply a table with a hole in it large enough to allow the number of a ticket to be seen through. At the side of the table is a cylinder wheel similar to that above described. The number on the cylinder is adjusted to be the same as that printed on the first ticket to be counted. The tickets are in consecutive order. As the boy turns a handle, they are jerked from the upper box to the lower, showing their numbers under the hole. The cylinder wheel revolves at the same rate, and therefore the number on each ticket and that on the wheel ought to agree. If they do not agree, then it is evident that a number has been omitted or perhaps duplicated. The deficient ticket being supplied or the surplus one removed, the tickets are then pressed together by machinery, tied, packed, and sent to their destinations. Such is one of the interesting industries of our time; an industry invented, developed, and still in the hands of one family; yet spread in its interests over the whole world. And it is curious to know that in one long low building, in a suburban street of a provincial town, the tickets for the whole world, except North America, are made.—*Chambers' Journal.*

RAILROAD EARNINGS IN NOVEMBER.

Name of Road.	Mileage. 1877.	1876.	Inc.	Dec.	Per c.	Earnings. 1877.	1876.	Increase.	Decrease.	Per c.	Earnings per Mile. 1877.	1876.
Atchison, Topeka & Santa Fe	786	711	75	.....	10.5	$335,675	$225,955	$109,720	.....	48.5	$427	$318
Burlington, Cedar Rapids & Northern	434	368	66	.....	15.2	138,985	94,908	44,077	.....	46.8	328	258
Cairo & St. Louis	146	146	.....	.....	.....	16,267	20,129	....	$3,862	19.2	111	138
Central Pacific	1,818	1,632	186	....	11.4	1,597,000	1,675,532	.....	78,532	4.7	878	1,027
Chicago & Alton	679	679	.....	.....	.....	392,846	367,898	24,948	.....	6.8	579	542
Chicago, Milwaukee & St. Paul	1,402	1,400	2	.....	0.1	892,000	765,230	126,770	.....	16.6	636	547
Cleveland, Mt. Vernon & Delaware	157	157	.....	.....	.....	36,008	30,029	5,979	.....	19.9	229	191
Dakota Southern	78	78	.....	.....	.....	24,307	17,297	7,010	.....	40.5	312	222
Denver & Rio Grande	304	206	98	.....	47.6	81,337	49,988	31,349	.....	62.7	268	243
Hannibal & St. Joseph	296	296	.....	.....	.....	174,749	154,857	19,892	.....	12.8	590	5 3
Illinois Central, Illinois lines	707	707	.....	.....	.....	452,048	429,614	22,434	.....	5.2	639	608
Indianapolis, Bloomington & Western	344	344	.....	.....	.....	80,815	93,646	.....	12,831	13.7	235	272
Kansas Pacific	673	673	.....	.....	.....	350,418	283,691	66,727	.....	23.5	521	422
Missouri, Kansas & Texas	786	786	.....	.....	.....	274,184	324,884	.....	50,700	15.6	349	413
Missouri Pacific	426	426	.....	.....	.....	346,311	338,043	8,268	.....	2.4	813	794
Nashville, Chattanooga & St. Louis	349	341	8	.....	2.3	158,731	147,193	11,538	.....	7.8	455	432
New Jersey Midland	86	86	.....	.....	.....	62,531	65,981	.....	3,460	5.2	727	767
Paducah & Memphis	115	115	.....	.....	.....	18,431	18,956	.....	525	2.8	160	165
St. Joseph & Western	227	227	.....	.....	.....	69,392	51,236	18,156	.....	35.5	305	226
St. Louis, Alton & Terre Haute—Belleville Line	71	71	.....	.....	.....	47,764	48,651	.....	887	1.8	673	686
St. Louis, Iron Mountain & Southern	685	685	.....	.....	.....	452,900	450,332	2,568	.....	0 6	661	657
St. Louis, Kansas City & Northern	530	530	.....	.....	.....	312,338	282,795	29,543	.....	10.4	589	534
St. Louis & San Francisco	328	328	.....	.....	.....	114,204	122,011	.....	7,807	6.4	348	372
St. Louis & Southeastern	356	356	.....	.....	.....	95,827	95,578	249	.....	0.3	269	268
Southern Minnesota	170	170	.....	.....	.....	85,000	71,450	13,550	.....	19.0	500	420
Toledo, Peoria & Warsaw	237	237	.....	.....	.....	92,086	101,075	.....	8,989	8.8	393	426
Wabash	688	628	60	.....	9.6	407,373	366,509	40,864	.....	11.1	592	584
Totals	12,868	12,383	485	.....	.....	$7,109,517	$6,693,468	$583,642	$167,593	.....	$552	$541
Total increase	.....	.....	485	.....	3.9	.....	.....	416,049	.....	6.2	.....	.....

RAILROAD EARNINGS, ELEVEN MONTHS ENDING NOVEMBER 30.

Name of Road.	Mileage. 1877.	1876.	In.	Dec	Per c.	Earnings. 1877.	1876.	Increase.	Decrease	P.c.	Earnings per mile. 1877.	1876.	Inc.	Dec.	P.c.
Atchison, Topeka & Santa Fe	734	696	38	....	5.5	$2,432,925	$2,282,298	$150,627	.....	6.6	$3,315	$3,279	$36	.....	1.1
Burlington, Cedar Rapids & Northern	379	368	11	....	3.0	1,120,327	1,037,583	82,744	.....	8 0	2,956	2,820	136	.....	4.8
Cairo & St. Louis	146	146	.....	....	.....	216,165	246,181	.....	$30,016	12.2	1,481	1,686	.....	$205	12.2
Central Pacific	1,774	1,394	380	....	27.3	15,329, 07	16,699,795	.....	1,370,688	8.2	8,641	11,980	.....	3,339	27.9
Chicago & Alton	679	653	26	....	4.0	4 148,774	4,586,177	.....	437,403	9.5	6,110	7,023	.....	913	13.0
Chicago, Milwaukee & St. Paul	1,402	1,400	2	....	0.1	7,447 460	7,443,882	3,578	.....	0.1	5,312	5,317	.....	5	0.1
Cleveland, Mt. Vernon & Delaw.	157	157	.....	.....	.....	354,869	345,874	8,995	.....	2.6	2,260	2,203	57	.....	2.6
Denver & Rio Grande	287	168	119	....	70.8	705,748	384,439	322,309	.....	83.8	2,463	2,288	178	.....	7.6
Grand Trunk	1,389	1,389	.....	.....	.....	8,640,109	8,663,796	.....	23,687	0.3	6,220	6,237	.....	17	0.3
Great Western, of Canada	511	511	.....	.....	.....	3,619,269	3,731,721	.....	11 ,452	3.0	7,083	7,303	.....	220	3.0
Hannibal & St. Joseph	296	296	.....	.....	.....	1,882 040	1,745,578	136,462	.....	7.8	6,358	5,897	461	.....	7.8
Illinois Central, Illinois lines	707	707	.....	.....	.....	4,661,525	4,994,790	.....	333,265	6.7	6,593	7,065	.....	472	6.7
Indianapolis, Bloom. & West'n	344	344	.....	.....	.....	1,114.545	1,349,148	.....	234,603	17.4	3,240	3,922	.....	682	17.4
Kansas Pacific	673	673	.....	.....	.....	3,022,672	2,783,872	238,800	.....	8.6	4,491	4,137	354	.....	8.6
Missouri, Kansas & Texas	786	786	.....	.....	.....	2,918,299	2,920,813	.....	2,514	0.1	3,713	3,716	.....	3	0.1
Missouri Pacific	426	426	.....	.....	.....	3,536,302	3,390,307	145,995	.....	4.3	8,301	7,958	343	.....	4 3
Nashville, Chattan'ga & St. Louis	345	341	4	....	1.2	1,586,144	1,558,680	27,464	.....	1.8	4,598	4,571	27	.....	0.6
New Jersey Midland	86	86	.....	.....	.....	634,235	614,498	19,737	.....	3.2	7,378	7,145	230	.....	3.2
Paducah & Memphis	115	115	.....	.....	.....	170,151	190,369	.....	20,218	10.6	1,480	1,655	.....	175	10 6
St. Joseph & Western	227	227	.....	.....	.....	466,068	411,957	53,111	.....	12.9	2,049	1,815	234	.....	12 9
St. Louis, Alton & Terre Haute, Belleville Line	71	71	.....	.....	.....	474,804	444,444	30,360	.....	6.8	6,687	6,260	427	.....	6.8
St. Louis, Iron Mt. & Southern	685	685	.....	.....	.....	3,968,988	3,494 280	474,708	.....	13.6	5,794	5,101	693	.....	13.6
St. Louis, Kansas City & North'n	530	526	4	....	0.8	2,891.729	2,875,872	15,857	.....	0.6	5,456	5,468	.....	12	0 2
St. Louis & San Francisco	328	328	.....	.....	.....	1,211 872	1,225,185	.....	13,313	1.1	3,695	3,735	.....	40	1.1
St. Louis & Southeastern	356	356	.....	.....	.....	1,009,417	998,751	10,666	.....	1.1	2,835	2,805	30	.....	1.1
Southern Minnesota	170	170	.....	.....	.....	621 237	581,133	40,104	.....	6.9	3,654	3,418	236	.....	6.9
Toledo, Peoria & Warsaw	237	237	.....	.....	.....	1,017,981	1,313,687	.....	295,706	22.5	4,296	5,543	.....	1,248	22.5
Wabash	643	628	15	....	2.4	4,133,909	4,011,547	122,362	.....	3.1	6,429	6,388	41	.....	0.6
Totals	14,483	13,884	599	....	.....	79,336,671	80,326,657	$1,883,879	2,873,865	.....	$5,478	$5,786	.....	$308	5.3
Total increase or decrease	.....	.....	599	...	4.3	.....	.....	.....	989,986	1.2	.....	.....	.....	.....	.....

General Railroad News.

ELECTIONS AND APPOINTMENTS.

Baltimore & Ohio.—Mr. M. L. Doherty has been appointed General Freight Agent, in place of Nathan Guilford, resigned. He has been for some time Traffic Manager of the company's Trans-Ohio divisions.

Burlington & Lamoille.—At the annual meeting at Dixon's, Vt., Dec. 19, the following directors were chosen: W. B. Hatch, N. Parker, Lawrence Barnes, Morillo Noyes, Elmore Johnson, G. L. Linsley, D. C. Linsley, Josiah Tuttle, H. M. Field, L. F. Terrill, H. F. Wetherbee, G. W. Hendee, Waldo Brigham. The board elected Wm. B. Hatch President; Nathaniel Parker, Vice-President; E. W. Peck, Secretary and Treasurer.

Central Branch, Union Pacific.—The following officers have been elected for the ensuing year: President, R. M. Pomeroy; Vice-President, W. C. Wetmore; Secretary, Thomas M. Sother; Treasurer, E. H. Nichols.

Central Vermont.—It is reported that Col. George W. Bentley is to be appointed Second Vice-President and General Manager. Col. Bentley is now Superintendent of the New London Northern and is an experienced and successful railroad man.

Cincinnati & Portsmouth.—Mr. W. H. Corbly is appointed Superintendent, in place of John C. Lewis, resigned.

Green Bay & Minnesota.—Mr. Timothy Case has been appointed General Manager, in place of D. M. Kelly, resigned. Mr. Case has been for a long time Superintendent of the Sussex Railroad in New Jersey.

Longview & Texarkana Air Line.—At the annual meeting in Longview, Texas, Nov. 30, the following directors were chosen: J. W. Borie, Samuel Cundiff, George G. Harrison, M. Heldt, W. J. Henderson, W. H. D. Hunt, J. C. Turner, W. W. Williams. The board elected Samuel Cundiff President; W. H. D. Hunt, Vice-President; J. C. Turner, Secretary; W. J. Henderson, Treasurer; H. F. O'Neal, Attorney.

Mt. Carbon, Gunnison & Lake City. The directors and officers of this new Colorado Company are: Directors, Sylvest r Richardson, L. Mullen, Warren Mullen, J. F. McDonald, J. Leonard; President, L. Mullen; Secretary, Warren Mullen; Treasurer, John M. Manphen.

Plainview.—This company has been organized by electing the following directors: Charles H. Bliss, George Bryant, Charles H. Chadbourne, George W. Van Dusen, Hugh P. Wilson. The board elected George W Van Dusen President and General Manager; Charles H. Chadbourne, Secretary and Treasurer.

Philadelphia & Reading.—Mr. I. V. Williamson has been chosen a member of the board of managers, in place of Isaac Hinckley, resigned.

Republican Valley.—The following officers have been chosen for the ensuing year: R. M. Pomeroy President; A. S. Barnes, Vice-President; A. W. Greenleaf, Secretary and Treasurer. The road is controlled by the Central Branch, Union Pacific, of which it is an extension.

Rocky River.—The board has elected Elias Sims President; M. J. Starkweather, Secretary and Treasurer; George G. Mulhern, Superintendent.

Santa Fe Canal.—The officers of this company, which is building a canal from Waldo, Fla., to Lake Santa Fe, are: President, George C. Rixford, Rixford, Fla.; Vice-President, B. B. Ewing; Chief Engineer, Ned. E. Farrell, Wald , Fla.; Secretary, D. S. Place, Waldo, Fla.

Springfield & Western Missouri.—The officers are: President, L. H. Murray; General Manager, H. E. Havens; Engineer, Robert L. Innes. The offices are at Springfield, Mo.

Sussex.—Mr. Irving Case has been appointed Superintendent, in place of his father, Mr. Timothy Case, who resigns to take charge of a road in Wisconsin.

Wheeling & Lake Erie.—At the annual meeting in Norwalk, O., Dec. 21, the following directors (one-third of the board) were elected, after a three days' fight: John W. Wickham, Jr., Huron, O.; G. T. Stewart, C. H. Gallup, Norwalk, O.; Joel Wood, Martin's Ferry, O.; James Bell, Wheeling, W. Va. Mr. Wood was formerly President of the company, and was dropped from the board a year ago. The defeated party claim that the election was not legal.

PERSONAL.

—Mr. Wm. Lannan, formerly Master Mechanic of the Western Maryland Railroad, is now employed in the Capitol at Washington, having been appointed Chief Engineer of the House of Representatives.

—Mr. Isaac Hinckley has resigned his position as a member of the board of managers of the Philadelphia & Reading Railroad Company.

—Mr. Nathan Guilford has resigned his position as General Freight Agent of the Baltimore & Ohio Railroad, and will accept a position as General Commissioner under the agreement

for the maintaining of east-bound rates. Mr. Guilford has been with the Baltimore & Ohio a long time, having been formerly Assistant General Freight Agent in charge of the business of the Trans-Ohio lines. He came to his late position about five years ago as successor to Mr. George R. Blanchard, now of the Erie.

—Mr. Wm. P. Ankeny, who died in Minneapolis, Minn., Dec. 20, owned large lumber and flour mills in that city, and was a director and one of the first and most active projectors of the Minneapolis & St. Louis road.

—Gen. R. H. G. Minty is reported to have resigned his position as General Manager of the Paducah & Elizabethtown Railroad.

—Mr. D. M. Kelly has resigned his position as General Manager of the Green Bay & Minnesota Railroad. He has been connected with the road from its beginning.

—Mr. Job H. Jackson, the well-known car-builder of Wilmington, Del., who was recently arrested on a charge of defrauding the State of Georgia, has been released upon further examination of the facts. Gov. Colquitt gave Mr Jackson the following letter on his release:

"It gives me pleasure to say that upon a full hearing of the facts in the case of the State against yourself, I am satisfied that the criminal suit was brought under a misapprehension. The Executive has no right or power to interfere with the Judicial Department of the Government or its proceedings; yet I shall advise that a *nolle prosequi* be entered in the case on the ground that the facts fully vindicate you.

"It is due to you that I make this statement and express my regret for the unpleasant circumstances that have attended the matter.

"It is due to the State and the attorneys that I should also say that the information we had, unexplained, justified in our view the course taken."

TRAFFIC AND EARNINGS.

Railroad Earnings.

Earnings for various periods are reported as follows:

	1877.	1876.	Inc. or Dec.		P. c.
Eleven months ending Nov. 30:					
New Jersey Midland..	$634,285	$614,498	Inc..	$19,737	3.2
Net earnings.....	132,730	.....	.....		....
Per cent. of exps...	79.07	.....	.....		....
Month of November:					
Northern, of Canada..	$63,267	$61,756	Inc..	$1,511	2.4
Toronto, Grey & Bruce.....	24,102	26,439	Dec..	2,337	8.8
First week in December:					
Denver & Rio Grande.	$17,160	.....	.....		....
Second week in December:					
Atchison, Topeka & Santa Fe	$77,093	$49,868	Inc..	$27,225	54.6
Denver & Rio Grande.	18,138	.....	.....		....
St. Louis, Iron Mt. & Southern.....	137,800	139,234	Dec..	1,434	1.0
Week ending Dec. 15:					
Grand Trunk.....	$201,926	$157,808	Inc..	$44,118	28.0

The St. Louis, Iron Mountain & Southern earnings above given are, for 1877 the third largest and for 1876 the second largest weekly earnings in the history of the road.

Coal Movement.

Coal tonnages are reported as follows for the week ending Dec. 15:

	1877.	1876.	Inc. or Dec.	P. c.
Anthracite	480,784	392,637	Inc..88,147	22.5
Semi-bituminous.....	61,031	62,174	Dec.. 1,143	1.8
Bituminous, Pennsylvania..	46,937	42,470	Inc.. 4,467	10.5

Bituminous and semi-bituminous tonnages not heretofore reported for the eleven months ending Nov. 30 were as follows:

	1877.	1876.	Inc. or Dec.	P. c.
East Broad Top.....	48,531	61,015	Dec.. 12,484	20.4
Bellefonte & Snow Shoe.....	38,774	46,122	Dec.. 7,348	15.9
Allegheny Region, Penna. R.R.	166,551	187,532	Dec.. 20,981	11.2
Penn and Westmoreland gas coal.....	679,274	781,770	Dec..102,496	13.1
West Pennsylvania R. R.....	169,794	180,420	Dec.. 10,626	5.9
Southwest Penn. R. R..	35,558	51,588	Dec.. 16,030	31.1
Pittsb'gh Region, Penna. R. R.	346,281	273,298	Inc.. 72,983	26.7
Totals.....	1,484,763	1,581,745	Dec.. 96,982	6.1

The Cumberland business is showing better figures than for some time past, and the Clearfield coal traffic continues to gain steadily, as it has throughout the year.

St. Louis Live-Stock Shipments.

The division of live-stock shipments from St. Louis to the East agreed upon at Cleveland and New York allotted 23⅝ per cent. of the total to each of these three roads—the Wabash, the Indianapolis & St. Louis and the Vandalia Line (the two latter pool their business and are allotted 47⅓ per cent. together, which they can divide as they please). Then the Chicago & Alton is to have 17 per cent. and the Ohio & Mississippi 12 per cent. There are five live-stock shippers who are to divide this traffic, for a consideration of $15 per car-load, which expense is to be shared by the roads carrying it between St. Louis and its destination. This is equivalent to about 12 per cent. on the present live-stock rate.

Sault Ste. Marie Canal.

The Superintendent of the Sault Ste. Marie Canal reports the following traffic for the season:

	1877.	1876.	Increase.	P. c.
No. of vessels passed through.	2,451	2,100	351	16.7
Tonnage of vessels.....	1,439,216	1,314,195	125,021	9.5
Tolls received.....	$42,730 39	$38,655 31	$4,075 08	10.5

The canal has been closed for the season and the usual winter repairs begun.

THE SCRAP HEAP.

Railroad Manufactures.

The Washburn Car Wheel Works, at Worcester, Mass., are making steel-tired wheels for the Boston & Albany.

The Kellogg Bridge Co., at Buffalo, has contracted to build a bridge 1,500 feet long over Loup Fork in Nebraska, on the Union Pacific road.

The contract for the new iron bridge over the Roanoke River at Weldon, N. C., on the Seaboard & Roanoke road, has been let to Clark, Reeves & Co.

The National Tube Works at McKeesport, Pa., are running to their full capacity night and day, and are still more than 3,000,000 feet of pipe behind their orders.

The Lake Shore & Michigan Southern shops at Cleveland, O., last week turned out a new sleeping car containing 14 sections or 28 berths. The woods used in the interior of the car are mahogany, satin, thuya and rosewoods. The absence of walnut—of which parlor cars are usually made—gives a much more cheery appearance to the car, and the bright red velvet furniture, silver plated lamps, fine frescoing, and soft carpets, form as elegant and comfortable quarters as the most tired or critical traveler could desire. The car is heated by hot water. The windows are all double, and the appliances for the circulation of pure air complete.

The Carthage Iron & Wheel Co., at Carthage, Jefferson County, N. Y., manufactures wheels for steam and street cars. The company makes its own iron from local ores and charcoal, and claims that it is of a superior quality for wheels.

Fast Time.

The Lafayette (Ind.) *Journal* of Dec. 18 says: "We have often noticed fast time being made on the Wabash Railway, since the putting on of their fast trains; but it was eft for No. 4 on last Saturday to beat anything ever done between Lafayette and Toledo. In consequence of the engine breaking down between Danville and Lafayette, the train was over one hour late leaving here, but went into Toledo on time. Engine No. 20—Chapman, engineer—took the train to Fort Wayne in two hours and 42 minutes—the quickest time ever made between Lafayette and Fort Wayne; and from the latter place, engine No. 46—Humphrey, engineer—to Toledo, accomplishing the whole distance of 203 miles in four hours and 42 minutes. Allowing time for stops, experts claim the distance was run in four hours, which is fully 50 miles per hour. This time has never been equalled in this country by a regular train with no preparations more than usual and making all regular stops."

Locomotives Erected in Quick Time.

It is said that recently two new locomotives were put together in the Michigan Central shops at Jackson in less time than any engines were ever erected before, both going out of the yard under steam in less than three hours from the time the boilers were brought into the erecting shop. Now if this was really done, many of our readers would like to know how it was done, and we should be glad to hear from any one who was present or knows the facts in the matter.

A New Oil Pipe Line.

The oil pipe line of the American Transfer Company, between Great Belt and Pittsburgh, is finished. The line is 90 miles long, 4-inch pipe. It will supply 28 refineries of the Standard Oil Company in Pittsburgh direct from the wells. The line occupied 125 men six months in laying.

Recognizing Old Employes.

The Pittsburgh *Telegraph* of Dec. 24 says: "Mr. Thomas Ridley, who has for 25 years been connected with the Pennsylvania Railroad, was, on Saturday, made the recipient of an elegant gold watch and chain, from President Scott, in recognition of his services in refusing to leave his engine at the demand of rioters last July. He also received a letter and $100 from Frank Thomson, General Manager. The letter from Col. Scott inclosing the watch was very complimentary."

The Springfield *Republican* says: "Conductor Strickland, of the New York, New Haven & Hartford road, who has been ill, has been presented by the company with a ticket to Europe and return—which is a rather unusual thing for a corporation to do."

A Slaughtered Brakeman.

An exchange tells the following: "A conductor on the Winona & St. Peter Railroad recently missed a brakeman from his train, and believing he had fallen from the train and been killed, telegraphed to head-quarters. He was ordered to back his train to the next station and look for the body. He did so without success, but on the return trip, passing through a passenger car, he discovered the missing man stretched across two seats and fast asleep. It would be unwise to print in a journal devoted to family reading the remarks in which the conductor indulged upon making the discovery."

Missouri, Kansas & Texas Car Report.

Master Car Builder J. C. Barber makes the following report for the month of October:

	Passenger.	Loaded freight.
Total mileage of trains.....	61,800	130,786
Total mileage of cars.....	326,504	1,963,481
Average number of cars per train	5.5	14.9
Cost of car repairs per train mile.....	12.33 cts.	8.25 cts.
Cost of repairs per car mile.....	2.34 "	0.54 "
Total cost of repairs.....	$7,625 75	$10,788 07
Mileage of Pullman cars.....	62,951	.....
Cost of Pullman car repairs per mile.....	0.82 cts.	.....

The total cost of Car Department, including all expenses, was $18,413.82. In computing freight car mileage, three empty cars are rated as two loaded ones.

Steam on the Erie Canal.

The New York *Tribune* says:

"It appears from the records of the Canal Collector's office, at Buffalo, that steam has been used upon the Erie Canal this year to a considerable extent. Besides the cable boats plying on the section of the canal between Buffalo and Tonawanda, tugs and regular steamers have been running all the season. The tugs came from Lake Champlain, Troy, and even from Baltimore, while others were owned in Buffalo. They went east a number of times, with tows of from two to four boats each. Of regular steamers, propelled by their own machinery, there were twelve employed this year, four running independently, and eight of them with a consort, which they pushed, instead of towing. Four made five round trips between Buffalo and New York during the season, three made four trips, and the others made two and three each, making in all 74 cargoes carried eastward from Lake Erie this season by the regular steam canal-boats. The number of cargoes transported by the boats in tow of occasional tugs cannot be stated, because the appearance of steam in the business of the canal was so unexpected that no provision had been made for keeping a separate record of the steamboats, and none was kept of the departures in tow of tugs. All except two or three of the regular boats appear to have been owned in New York City. They were sent out one at a time early in the season to make the experiment of competing with horse-boats and railroads. Owing to the low tolls and heavy business of the canal, it was found profitable to operate them, and in the latter part of the season they were all busily employed. Five hundred dollars was paid for the use of one of them to make three trips from this city to Buffalo and back. It is reported by the owners of these boats in this city, that the steamers worked well, received a slight preference in freights, and established the entire practicability of steam transportation on the canals of the State of New York. The boats will be operated next year. This subject has been receiving the attention of the Canal Commissioners, and a report will be made upon it to the Legislature."

Train Accident Report—A Correction.

We are informed that a collision reported as having occurred on the Atlanta & Charlotte Air Line, near Charlotte, N. C., Nov. 25, did not, in fact, take place at all. The report was taken from a local paper, and probably arose from its confusing reports of a washout accident on the same road two days previous

Draughtsmen.

A correspondent in the *English Mechanic* thus discourses, and with much truth, on this worthy class of people: "The genus draughtsman is usually a willing, submissive, overworked machine, too deeply absorbed in his problematical tasks to give many thoughts to self, or even anything else but his work. Why is the average draughtsman so seldom a marrying man? He does not care to add to his other worries those of a family, and, what is more, he has not time. Why is he not a social or a public man? He has not time. He has no time for recreation, and not even for sleep; his evenings are spent poring over some equation, and his nights dreaming out the work of to-morrow. The draughtsman is the 'hub' round which the shop rotates, but no one knows it, not even himself, till he is missed, till he gives up the toils through over anxiety, close application, and starvation pay, at a much lower average age than 40. Yet he is constantly maligned by masters—his superiors—on the one side, and foremen—his inferiors—on the other. This at least strongly applies to a certain class of foremen. With what delight they approach the head of the firm if a fancied mistake is discovered. Oh! it was the draughtsman, of course. Yet, if that individual takes ill what commotion is caused, what searching and inquiring! I have actually known an important contract detained three months through the draughtsman taking ill, yet that man had not boilermaker's pay."

"Slipper" Railroad.

The *English Mechanic* gives the following account of a novel form of railroad which, we infer, is to be employed near the Paris Exhibition:

"MM. Borie and DeMouncie have obtained a concession for the construction and working of a railway designed to facilitate the ascension of the Trocadero. The system to be employed is that of the late M. Girard, the celebrated hydraulic engineer, and which was experimented upon at the Jonciere in 1869. It is of the following character: The vehicles are not carried upon wheels or axles, but upon slippers, which slide in a very shallow, flat trough rail. At the centre of the slipper is a small aperture which communicates by a pipe with a reservoir of water compressed or held under a pressure of three atmospheres. In virtue of this pressure a film of water about one millimetre in thickness is, it is claimed, continually present between the rail and slipper surfaces during the running of the train. The slipper slides over this thin bed of water with scarcely any friction whatever. The descending journey is performed simply by the weight of the train. At the bottom of the gradient a steam engine compresses the air and water required to a pressure of thirty atmospheres. This water is, according to the *Journal des Mines*, passed through a turbine at the rear of the last vehicle, and by it is caused to impel the train. The details of this are, however, not described. The line from the Trocadero will be 1,312 yards in length, or 0.745 mile, runs along by the right side of the Quai de Billy, and terminates at the Roi de Rome, within the Exhibition."

A Narrow Escape.

The Raleigh (N. C.) *News* says: "The Seaboard & Roanoke Railroad bridge which was washed off by the recent flood in the Roanoke, was not the first at that place that has met with the same fate. In January, 1863, during the time of a high flood in the river, a train of cars having on board a brigade of Confederate soldiers passed over the bridge. Captain R. A. Shotwell, now editor in chief of the *Farmer and Mechanic*, in this city, was in command of a company in the brigade, and as the last coach of the train reached the bank on the north side of the river, those in it perceptibly felt the bridge give way slightly under them. The train passed over safely, but before it reached Garysburg, two miles off, the entire structure of the bridge gave way and was carried down the stream. This was a narrow escape; had it fallen a few minutes earlier, twenty-five hundred men would have been struggling in the water as it boiled over the falls below."

Tramps.

The Utica (N. Y.) *Herald* of recent date says: "Conductor Kincaid found two retired canal men on top of the baggage car of the first Pacific express this morning. They said that they were so used to sleeping on deck that riding in the palace car did not agree with them in warm weather. The brakeman attempted to punch their coupons with his boot, but they passed West too rapidly."

Cruelty to Animals.

On railroads where live poultry is a considerable item of freight, much unnecessary suffering is often caused by too great economy in boxing and by careless handling. To prevent this, the officers of the Lake Shore & Michigan Southern road have instructed station agents not to receive live poultry for shipment unless the coops containing the same are constructed high enough to permit the poultry to stand up "without crouching," and with the slats on the top so arranged that they can put their heads out. Agents are also requested, in stowing coops in cars or depots, not to pile one on top of another, and thereby cause unnecessary suffering.

A Sleeping Car Episode.

Only a few nights ago an accident occurred on the Northwestern road in which a sleeping coach was turned over on its side. As the car went over a lady in a berth on the opposite side was hurled out and landed in the berth of a gentleman whose weight was about 250 pounds. She was sound asleep at the time of the accident, and so was he. Both awoke, startled at the sudden turning of the car, and scarcely knowing whether they would be hurried into eternity or not. The clothing had fallen out of the lady's berth and was almost suffocating the gentleman. She heard his deep breathing for a moment; then it suddenly ceased, and the horrible thought passed through her mind that he had been smothered to death. He recovered himself, however, to find that his nose was flattened against the cold glass window. Not knowing what manner of person had fallen upon him, he held the lady up off his head, and at this juncture, when the conductor asked if any one was hurt, he cried out breathlessly: "Nobody's hurt, but I wish you'd come and take this fellow off my head." The lady attempted to move, but found she could not. Lights were soon procured and both passengers were relieved of their awkward dilemma.—*Nashville American.*

An Unexpected Dump.

A coal car will sometimes dump its load when least expected, as is shown by the following from the *Cattaraugus Journal:* "Last Monday night a party of five tramps were stealing a ride in an empty coal dump on McGuire's train on the Erie Railway. Near Sheridan the bottom of the dump dropped down, and two of the tramps went down through under the train. The head of one was severed from his body and the other was badly mangled but lived a few hours. The unfortunate men were from Buffalo."

A Bridge "Without a Span."

The *Polytechnic Review* copies from the Philadelphia *Evening Telegraph* the following item:

"An agent of the Russian government is in this city for the purpose of entering into a contract to bridge the Danube, and for that purpose visited the office of the Keystone Bridge Company, on Monday. The terms stipulated for a bridge of 2,100 feet in length, without a span, to be ready at the beginning of the spring. The Government was ready to spend $3,000,000, but the Keystone Company at once said that it was impossible to bridge the Danube without a span, and that it would also be impossible to complete it within the specified time."

No wonder the Keystone Bridge Company declined the order. We have heard of the play of "Hamlet" with the part of Hamlet left out, and of a man who believed in narrow-gauge railroads all excepting the gauge, but a bridge "2,100 feet in length without a span" is a charming example of reporter's, or perhaps polytechnic, engineering. The abutments, it may be supposed, are to be anchored to balloons.

New Motor.

Nature says that Fernando Tommasi has recently constructed a "thermo-dynamic motor," in which work is done by the mere dilatation of oil, without change of state.

The Effect of Heat on the Tenacity of Various Metals.

A series of experiments were recently made at the Portsmouth (English) dockyard "to see whether gun metal [a mixture of about three-quarters to seven-eighths copper, with one-quarter to one-eighth of tin and zinc] would be more or less suitable than cast iron, for making such articles as stop and safety valve boxes, steam pipe connections, fastenings, etc., which might be subjected to high temperatures." It was found that "all the

varieties of gun metal suffered a gradual, but not serious, loss of strength and ductility up to a certain temperature, at which, within a few degrees, a great change takes place, the strength falls to about one-half the original, and the ductility is wholly gone. The precise temperature at which this great change takes place, although uniform in the specimens cast from the same pot, varies about 100 degrees in the same composition at different temperatures, or with some varying conditions in the foundry process. The precise temperature at which the change took place in one series was ascertained to be about 370 degrees, and in another a little over 250 degrees. Whatever may be the cause of this important difference in the same composition, the fact stated may be taken as quite certain. The possibility of such a change taking place at a temperature so low in the best gun-metal, used for the more important parts of machinery and boiler mountings, is so important that the point was most carefully tested by repeated experiments at the same temperature, both sorts being heated at the same time in the bath."

Phosphor bronze diminished in tensile strength in the proportion of 609 to 420 firm atmospheric temperature to 500 degrees, Fahr. Muntz metal in the proportion of 700 to 620; copper, 460 to 390, cast iron, 480 to 400. Wrought iron increased in one case in the proportion of 500 to 680; in another, 460 to 550; and steel, 555 to 600.—*Journal of the Franklin Institute.*

Safety by Rail and Coach.

A writer in the *Annales des Ponts et Chaussees* gives some curious statistics as to accidents on French railroads. From his numerical data he infers that, in the time of the Messageries (stage coach companies) a traveler had about one chance of being killed in making 300,000 journeys, and one of being wounded in 30,000. On the railroads, from 1885 to 1855, there was one chance of being killed in making 2,000,000 journeys, and of being wounded in making 500,000. On the railroads, from 1855 to 1877, one chance of being killed in making 6,000,000 journeys, and one of being wounded in making 600,000. From 1872 to 1875, corresponding numbers 45,000,000 and 1,000,000 journeys. Pursuing his calculations the author demonstrates that a person who traveled continually by rail ten hours a day, at a velocity of 31 miles an hour (supposing the mean length of the journeys to be about 18½ miles), would have had, during the three periods indicated, the following chances of being killed: From 1835 to 1855, one chance in 521 years; from 1835 to 1875, one chance in 1,014 years; from 1872 to 1875, one chance in 7,430 years. To compare with England and Belgium: In France, during 1872 to 1875, there was one passenger killed for every 45,258,270 passengers conveyed, and one wounded for every 1,024,360. In England the corresponding numbers are 12,000,000 and 366,000. In Belgium, 20,000,000 and 3,500,000.

RAILROAD LAW.

Measure of Land Damages.

In Bunnell against the Pennsylvania & New York Company, the Pennsylvania Supreme Court held:

1. The measure of damages for land taken by a railroad is the difference between the market value of the property before and after the construction of the road, so far as that difference was caused by the construction.
2. The market value of land is not a question of science and skill, upon which only an expert can give an opinion.
3. Evidence as to the price offered and paid for other property in the neighborhood should not be received.

Negligence in Keeping Road Crossings Clear.

In Smith against the Indianapolis & St. Louis Company, the Illinois Supreme Court held that it is negligence in a railway company to permit or suffer weeds or anything else to grow upon its right of way to such a height as to materially obstruct the view of a highway crossing, and if injury results to stock at such crossing, that might have been avoided but for such obstruction, the company will be liable.

Use of Steam Power on a Public Street.

In Macumber against Nichols, the Michigan Supreme Court held as follows:

The use of steam power for purposes of locomotion on the common highways is not unlawful, provided due care is observed, and a proper regard had to the rights of others. The fact that one, for a lawful purpose, takes into the highway an object which is calculated to frighten horses of ordinary gentleness does not necessarily render him liable for any resulting injury. Those who make use of the highway by means of horses have no rights superior to others, and new modes of locomotion are perfectly admissible, provided they are reasonably consistent with existing modes. If injury results, the question of liability is a question whether reasonable care has been observed; and this is a question of fact, and must be submitted to the jury as such.

Rights of Mortgagors in Possession.

In W. S. Gilman and others against Telegraph Company and others, the United States Supreme Court recently decided to sustain the judgment of the Circuit Court. The suit was brought to restrain the collection of a judgment obtained against the Central Railroad of Iowa, on the ground that the property and its income belonged properly to the bondholders, who had a foreclosure suit pending at the time the judgment was obtained. The Court held that it would have been perfectly competent for the Court below to have appointed a receiver and directed the application of the income to certain uses. This was not done, however, and the road was left in possession of the company. Being in possession the mortgagor, that is the company, had the right to receive and dispose of the income, and was liable to the creditors. The mortgagees, having done nothing to protect themselves, could not lay claim to the income or fund in controversy.

Lien for Money Advanced.

In Tackney against the Cairo & Vincennes Company the Illinois Supreme Court held:

1. If a party, at the request of a railroad company, takes up certificates of indebtedness issued by it to its laborers for work, and to procure board, and to enable boarding-house keepers to obtain groceries and provisions for hands engaged in the construction of the road, with an agreement to settle with him for the same, such party will be entitled to recover of the company the amount of such advances.
2. The lien given by statute against the property of a railroad company is only for materials used, supplies furnished and for labor performed in constructing, repairing, operating or maintaining the road. The loan of money, or the payment of its creditors, is not embraced in the statute giving the lien.
3. A party who, at the request of a railway company, takes up its certificates of indebtedness given to its laborers and others for the boarding of hands, is not entitled to any lien, under the statute, against the company or its property.
4. Although a laborer upon a railroad has a lien by statute for the sum due him, it is not assignable at law, and even if assignable, it would not entitle the holder of the same to assign the lien.
5. Liens are enforcible in equity, unless the law has provided another mode. This is true of vendor's liens, equitable and other mortgages, and all statutory liens, except when the lien is in the nature of a pledge, and possession accompanies the lien. A court of law does not possess the means of enforcing such liens.

Injury to Employes.

The case of Rhodes against the Georgia Railroad Company was a suit brought to recover for injuries received from a collision. The plaintiff, who was baggage-master on one of the trains, seeing the collision was inevitable, jumped and broke his ankle. The conductor, who was in the baggage-car, testified that he told him not to jump. Plaintiff obtained a verdict for $6,000 in the Circuit Court, and the company appealed to the Supreme Court, which affirmed the judgment, holding:

1. The only orders of the conductor which the plaintiff, as baggage-master, was legally bound to obey, were such as appertained to his duties as baggage-master, and not such as appertained to the protection of his own life when the trains were about to collide.
2. The plaintiff, an employe as baggage-master on the defendant's train, took upon himself the risks and dangers necessarily incident to his employment in that capacity when the other agents of the defendant, his co-employes, performed their duty, but he did not take upon himself the risk and danger of being killed by the collision of the defendant's trains, in consequence of the negligence of its agents.
3. The plaintiff, as baggage-master, was not presumed to know whether the rules and schedule provided for the running of the defendant's trains on its road were defective or ambiguous, inasmuch as it was not his business to run the defendant's trains, or either of them; that duty devolved upon the conductor and engineer of the defendants' respective trains.
4. The plaintiff was not at fault in jumping from the train under the circumstances, as shown by the evidence in the record; it was an act of reasonable precaution to protect himself from danger when he saw that the collision of the two trains was inevitable, although he might not have been injured if he had remained in the car, but the plaintiff could not have foreseen that.

There is sufficient evidence in the record to sustain the verdict of the jury, which is not excessive under that evidence. The collision of the defendant's trains, by which the plaintiff was injured, was caused by the gross negligence of its agents, and when that is the case this court will not readily interfere with the verdict of the jury.

In Galloway against the Western & Atlantic Company plaintiff sued for injuries received, and defendant pleaded a special contract by which plaintiff assumed all risks incident to his occupation; also a settlement had in satisfaction for the injury received, and finally, that the injury was received not on the defendant's road, but on the Nickajack Railroad. The Circuit Court gave judgment for the defendant and the Supreme Court sustained it on appeal, holding that the agreement was a sufficient bar to recovery. The fact that the train was on the Nickajack road at the time the injury was received made no difference. If the plaintiff knew, as he claimed that he did, that that road was unsafe, he could and should have refused to go upon it with the train.

Taxation of Property in the Hands of Receivers.

The St. Louis *Central Law Journal* says: "The question of the right to distrain for taxes assessed against property in the hands of receivers has excited considerable interest in the United States Circuit Court for the Eastern District of Missouri, in consequence of the railway litigation pending in that court. During the past year, two great railways have been operated by receivers appointed by that court, and, within the period of the receivership, a year's taxes have fallen due, and steps have been instituted by the authorities to whom they were due to collect the same. In some of these proceedings, counsel have asserted that it has been held by the United States Circuit Court for the Northern District of Illinois, that the local authorities may distrain property for taxes, even when such property is in the custody of receivers appointed by the Federal court. We have taken pains to write a letter of inquiry on this subject to the learned and courteous editor of the Chicago *Legal News*, and have just received an answer, informing us that Judge Drummond has rendered no such decision, but that he has decided that tax collectors, acting under the authority of the State, must first make demand of the receivers for the payment of the taxes claimed to be due, and must, in case of non-payment, apply to the court that appointed the receivers. We learn from the same authority that Judge Blatchford has decided that, under such circumstances, tax collectors may distrain. We can scarcely see upon what principle Judge Blatchfore could have placed such a decision. To permit the levying of adverse process upon property in the hands of receivers, under any circumstances, would work the most unseemly conflicts of jurisdiction and infinite confusion. The payment of public taxes, lawfully assessed and levied, is the highest equity; and when a court, through its receivers, has the custody of property against which taxes are assessed, it never will, or at least it never should, suffer its own possession to interfere with the regular flow of public taxes into the hands of the collectors to whom they are payable. Under such circumstances, it is presumed that a court will always, upon proper application being made, order its receivers to pay the taxes out of the rents and profits in their hands; and if such income be not sufficient to discharge the taxes, it is presumed that the court will order the property, or a sufficient part thereof, to be sold to meet the same."

Fires Caused by Negligence.

In Coates against the Missouri, Kansas & Texas Company the Missouri Supreme Court recently reversed the decision of a lower court. In this suit, which was for damages against a railroad company for the burning of a building of plaintiff, caused by the escape of sparks from defendant's locomotive, it appeared that the house was uncompleted and of frame, situated about one hundred feet from the track; that the carpenter had suffered shavings to accumulate about the house, and that the sparks were blown by a high wind from the locomotive into the dead grass adjoining the track, and from thence fire was communicated to the shavings and the building. *Held*, as follows: 1. The escape of the fire from the engine was the proximate cause of the damage, and proof of its escape established a *prima facie* case of negligence which would render the company liable. But to rebut such presumption defendant might show its employment of careful and competent servants, and use of the best contrivances to prevent the escape of fire. Such facts being shown, it devolved upon plaintiff to prove actual negligence on the part of defendant. 2. In accumulating combustible material plaintiff and defendant were equally negligent, and plaintiff could not recover on that score.

OLD AND NEW ROADS.

Anderson, Lebanon & St. Louis.

On application of the Cleveland Rolling Mill Company as a creditor, the Indiana Circuit Court has appointed James A. Larnard Receiver of this road.

Atlantic & Great Western.

In the suit of Belden & Co., contractors, against this company and others, the Pennsylvania Circuit Court has made perpetual the temporary injunction heretofore granted to restrain the company from paying out any part of the trust fund formed for the purpose of building the Pennsylvania Petroleum road.

Billerica & Bedford.

Recently this company authorized an issue of bonds to pay its floating debt of over $20,000. The bonds sold very slowly, however, only about $3,000 having been taken, and last week S. K. Reshel, of Danville, Pa., who furnished the rails, put an attachment on the property to secure his claim for a balance of some $2,500 due him. Nearly all the directors also resigned recently, and a sort of panic seems to have arisen among the stockholders. A meeting was called for Dec. 20: it was held with closed doors, but it is stated that a resolution was passed directing the officers of the company to file a petition in bankruptcy.

The road is about eight miles long, from Bedford, Mass., to Billerica. It has been built as an experiment, being of only 24 inches gauge. A statement has gained wide currency that the road is of 10 inches gauge, which is not true. The mistake has arisen from confusing with accounts of this road those of an experimental line, a few hundred yards long, at Hyde Park, Mass., which is of 10 inches gauge and was built some time ago by Mr. George E Mansfield, the engineer of the Billerica & Bedford. The present difficulties of the company have arisen from failure to pay up stock subscriptions and other causes which have little or nothing to do with the earning capacity of the road. It has been opened so short a time that its value has not been fairly tested as yet.

Burlington & Lamoille.

At the annual meeting, held Dec. 19, the directors reported that the road was completed about July 1, but was not fully in operation until the end of that month, because the Portland & Ogdensburg was not yet ready for business. The road extends from Burlington, Vt., to Cambridge Junction, 29 miles; the track is laid with rails 56 lbs. to the yard, one-third being of iron and two-thirds of steel. The amount of the engineer's estimate to contractor less amount reserved on contract, was $579,860.32. The road is equipped with three locomotives; four passenger and two baggage cars; 36 box and eight flat cars, and a sufficient number of hand and dump cars. The engines and freight cars are not yet fully paid for. The stock issued is $532,850; bonds, $850,000; company's notes, $211,043.49, secured by pledge of $652,000 bonds. The land damages are all paid, except one or two trifling claims.

The earnings for the three months' operation of the road, from Aug. 1 to Oct. 31, were:

Passengers	$5,694 23
Freight	8,400 31
Express, mail and car service	1,338 67
Total ($532.18 per mile)	$15,433 21
Expenses (58.32 per cent.)	9,000 43
Net earnings ($221.82 per mile)	$6,432 78

The road was opened too late in the season to get any of the summer traffic. It has had to rely upon the local business alone, owing to the refusal of the Portland & Ogdensburg to run its through train so as to make connections possible. Negotiations for a better arrangement are now in progress.

Camden & Atlantic.

It is said that this company is considering the question of building a branch from Absecom, N. J., north by east to Tuckerton, about 17 miles. An inspection of the route was made recently.

Central Vermont.

The St. Albans (Vt.) *Messenger* notes an important change in the management of the Central Vermont railroad business. For some time a majority of the directors are said to have been dissatisfied with the results attained by the management of the property, and, after the Supreme Court refused to indorse Gov. Smith's proposed reconstruction scheme, a committee was appointed to report a plan for securing a better future conduct of affairs. At the recent Boston meeting of the directors this committee recommended the appointment of a General Manager, to assume entire charge of the revenues and expenditures of the road, and to be responsible to the board. Accordingly, Superintendent George W. Bentley, of the New London Northern Railroad succeeds ex-Congressman Worthington C. Smith, as Second Vice-President of the Central Vermont Company, and assumes practical charge of its affairs, although Gov. Smith still remains President. Under Manager Bentley, Lansing Millis of Boston will remain in charge of the through traffic of the road, with an advisory board of two men chosen by the Central Vermont people, and one each by the Boston Lowell and the Northern roads. Further reorganization is likely to take place as soon as Mr. Bentley assumes his new duties.

Cumberland Valley.

The bridge over the Potomac at Williamsport, Md., washed away by the recent freshets, is to be replaced by a substantial iron bridge. The road-bed on both sides of the river is to be raised.

Des Moines & Minnesota.

The extension of this road from Ames, Ia., is now completed to Story City, which is 10 miles northward from the late terminus, and 47 miles from Des Moines. The grading is completed for some 15 miles further, and work is progressing steadily.

Dividends.

Dividends have been declared as follows:

Union Pacific, 2 per cent., quarterly, payable Jan. 1. Transfer books are closed from Dec. 22 to Jan. 2.

Lake Shore & Michigan Southern, 2 per cent., payable Feb. 1.

Warwick Valley, 4 per cent., semi-annual.

Eastern Counties.

Work on this Nova Scotia line has been nearly suspended for the winter, though some men are still employed in getting out ties. A good deal of grading has been done, and all the masonry for the 40 miles between New Glasgow and Antigonish is up. The bridges at French and Barney rivers will be erected during the winter.

Emlenton & Clarion.

This road is now completed and the formal opening to the new terminus at Clarion, Pa., took place Dec. 20. Clarion is 27½ miles from Emlenton; where the road connects with the Allegheny Valley, and eight miles beyond the late terminus as Shippenville.

Erie.

Receiver Jewett's report for October is as follows:

Balance, Oct. 1	$374,777 47
Receipts for the month	2,457,054 81
Total	$2,831,832 28
Disbursements	2,190,499 72
Balance, Nov. 1	$641,332 56

The receipts exceeded the disbursements by $266,555.09 for the month. The amount of Receiver's certificates and interest unpaid on Nov. 1 was $1,962,147.68.

In New York, Dec. 21, argument was heard on a motion to vacate an order directing the Receiver to allow Isaac S. Fowler to examine his books and also to show cause why he should not be removed from his office. A large number of affidavits were also submitted in the McHenry suits. Both matters were adjourned to Dec. 31.

Foreclosure Sales.

The *Maryland & Delaware Railroad* was sold in Easton, Md. Dec. 20, the section in Maryland under a decree of the State court and that in Delaware under a decree of the United States Circuit Court. The Maryland section brought $75,000 and the Delaware section $19,200, both being bought by Wm. T. Hart, of Boston, for account of the bondholders. The road is 52 miles long, from Clayton, Del., southwest to Oxford, Md.

The sale of the *Erie Railway* is to take place in New York, Jan. 21, under the decree of foreclosure of the New York Su-

preme Court, and a concurrent decree of the Chancellor of New Jersey.

Fort Worth & Northwestern.

It is proposed to build a railroad from Fort Worth, Texas, north by west to Decatur in Wise County, about 45 miles. Subscriptions amounting to $100,000 have been offered and contractors have offered to build the road and take $80,000 of the stock in part payment.

Gulf, Colorado & Santa Fe.

The old board has published a very long statement setting forth the history of the road and defending its action in refusing to give up possession to the directors lately chosen. The statement is very full, but contains nothing new. The board professes a desire to have all the legal questions involved settled as soon as possible.

Indianapolis, Peru & Chicago.

This company has concluded an agreement with the Cleveland, Columbus, Cincinnati & Indianapolis for the joint use of the tracks into the city of Indianapolis. The matter has been under discussion for some time.

James River Valley.

A bill to incorporate this company has been introduced in the Virginia Legislature. It provides for the construction of a railroad along the line of the James River & Kanawha Canal from Lynchburg, Va., to Buchanan, about 40 miles, to connect at the last-named place with the Buchanan & Clifton Forge. The project is to use the works of the canal and replace it entirely by the railroad.

Kaskaskia & Chester.

The grading of this road is now well advanced and tracklaying has been begun. The road is to extend from Chester, Ill., northwest about eight miles to the old town of Kaskaskia. It is built by parties interested in the Iron Mountain, Chester & Eastern, and will be worked as a branch of that road.

Lake Shore & Michigan Southern.

At a meeting of the board in New York last week the following statement was presented for the year ending Dec. 31:

	1877.	1876.	Inc. or Dec.	P. c.
Gross earnings (December partly estimated)	$13,532,939	$13,949,177	Dec. $416,238	3.0
Expenses and taxes	9,023,955	9,574,835	Dec. 550,880	5.8
Net earnings	$4,508,984	$4,374,342	Inc. $134,642	3.1
Interest, rents and guaranteed stock dividends	2,742,000	2,759,989	Dec. 17,989	0.7
Balance	$1,766,984	$1,614,353	Inc. $152,631	9.5
Per cent of expenses	66.60	68.64	Dec. 2.04	3.0
Per cent. of net balance to stock	3.57	3.25	Inc. 0.32	9.8

The net balance of 1877 is appropriated as follows:

Net balance		$1,766,984
Ashtabula accident	$493,940	
Sinking fund	250,000	
Dividend of 2 per cent.	989,330	
		1,733,270
Surplus		$33,714

During the year about 15,000 tons of steel rails have been substituted for iron. The cost of the substitution was paid out of current revenue, and is included in the amount of expenses above stated. The amount so substituted in 1876 was about 10,500 tons.

The company has no floating debt, nor outstanding obligations in that nature. Claims on account of the Ashtabula accident have substantially all been settled.

During the year the bonded debt has been reduced $250,000 by the fulfillment of the requirement of the sinking fund, and now stands at an aggregate of $35,750,000, against $36,000,000 at the end of 1876.

The road, machinery and property have been, in all respects, fully maintained at their high standard condition, and in many respects materially improved.

It will be seen that the Ashtabula accident absorbed very nearly 1 per cent. on the stock and 30 per cent. of the net earnings.

Lexington & St. Louis.

The purchasers of this road have organized a new company, known as the St. Louis & Lexington Railroad Company, and have filed the necessary certificates. The road is 55¼ miles long, from Sedalia, Mo., to Lexington, and is worked by the Missouri Pacific.

Louisville, Cincinnati & Lexington.

The new company is now offering to fund the past-due coupons on the bonds issued under the Green mortgage, with interest thereon, in its new 7 per cent. bonds, the new bonds to be issued at 85 per cent. and interest.

Montclair & Greenwood Lake.

A hearing was had before the Chancellor of New Jersey last week on an application to authorize the Receiver to issue a considerable amount of certificates. The Chancellor denied the petition as to a part of the proposed issue and ordered a further hearing as to the rest.

New Jersey Midland.

The earnings for November and the eleven months ending Nov. 30 were:

	November.	Eleven months.
Passengers	$10,621 76	$131,436 14
Freight and milk	49,222 56	428,249 93
Express, mail, etc	2,676 98	74,548 44
Total	$62,521 30	$634,234 51
Working and terminal expenses	52,796 36	501,504 08
Net earnings	$9,724 94	$132,730 43
Per cent. of expenses	84.45	79.07

The freight and milk accounts are unusually heavy for the season, market freights and dairy products forming a larger item than usual. The Receivers' account for the month is as follows:

Balance, Nov. 1		$1,207 86
Earnings, as above		62,521 30
Suspense account		1,136 80
Loan account		8,360 00
Total		$73,226 96
Expenses as above	$52,796 36	
Right of way claims	250 00	
Construction	2,407 09	
Equipment, payments on cars	963 85	
Mid., Unionville & Water Gap, rent and taxes	3,969 24	
Montclair & Greenwood Lake terminals	1,444 28	
Discount, interest and loan account	9,419 46	
		71,250 28
Balance, Dec. 1		$1,975 68

As compared with 1876, the gross earnings for November show a decrease of $3,459.36, or 5.2 per cent.; for the eleven months, an increase of $19,736.76, or 3.2 per cent.

New York Central Underground.

The New York *Herald* on Dec. 22 published a telegram from London stating that a syndicate with a large capital had been formed there to build an underground rapid transit road in New York, under what is known as the Central Underground Charter. The head of the syndicate is said to be Sir Edward Watkin, known best here from his connection with the Erie. There is little reason to believe that the report is true.

Northern Pacific.

Land Commissioner Powers makes the following report: "The sales by our company the past three months were as follows, including both Minnesota and Dakota:

September	101,735.66	Acres.	$463,541 60
October	83,191.90	"	390,087 97
November	65,732.55	"	284,680 40
Totals	250,650.12	"	$1,138,269 97

"Of this amount over 50,000 acres of Minnesota lands have been taken in small lots of from 40 to 200 acres each by parties buying for settlement, the majority being occupied this Fall.

"The majority of purchases in Dakota are for cultivation, a number of large farms, ranging from 1,000 to 5,000 acres each, to be opened in the spring at various points on the line between Fargo and Bismarck.

"Including the large purchases of over 1,000 acres each, about 16 per cent., the remainder has been taken in lots ranging from 160 to 640 acres each. Reports from Fargo United States land district for five months ending Sept. 1, show government lands covering 100,846 acres, taken by 646 new comers."

Pacific Railroads and the Government.

Arguments were heard last week in Washington before the Secretary of the Interior and the Attorney General as to the violation of law by the Union Pacific Company in refusing to pro-rate on through business with the lines connecting with it west of the Missouri. The arguments occupied several days, counsel being present for the Union Pacific, the Kansas Pacific and the Burlington & Missouri River in Nebraska.

Plainview.

This new company is organized to build a line of standard gauge from Plainview, Minn., to the Winona & St. Peter road near Eyota, about 14 miles. The capital stock is to $200,000.

Scioto Valley.

This road will be opened for freight and passenger traffic through to Portsmouth, O., Dec. 31. Arrangements have been made for a special line of steamboats between Portsmouth and Huntington, W. Va., to be run in connection with this road and the Chesapeake & Ohio, both for passenger and freight business.

Springfield & Western Missouri.

Tracklaying has begun on this road at Springfield, Mo. The road is built on the line of the old Kansas City & Memphis road, and was graded in 1872, the present company acquiring possession in 1875. It is graded from Springfield to Greenfield in Dade County, 45 miles, but only 20 miles are under contract at present, the contractors being McCarty & Burgess. It is expected that this 20 miles, from Springfield to Ashgrove, will be completed by March next. The road is to be of standard gauge; the iron is furnished by the Springfield Iron Company, of Springfield, Ill.

Southeastern, of Canada.

The Vermont Chancery Court has granted the application of the Passumpsic Company for a Receiver for the Missisquoi & Clyde Rivers road, the portion of the Southeastern in Vermont. The Court appointed as Receiver Mr. A. E. Folsom, Superintendent of the Passumpsic road.

Later reports are that an amicable settlement between the two companies has been agreed upon and that the Southeastern trains are running as usual. These reports, however, need confirmation.

Southern Pacific.

The Los Angeles & San Diego road, which is leased to and really owned by this company, has been extended from the late terminus at Anaheim, Cal., southward seven miles to Santa Ana. The distances from Los Angeles on the extension are: Anaheim, 26.7 miles; Orange, 31.6; Santa Ana, 33.6. It is said that a further extension to San Juan Capistrano, 25 miles from Santa Ana, will be built next year, leaving 65 miles more to reach San Diego.

St. Paul & Pacific.

For the eleven months ending Nov. 30 the sales of Main Line lands were 67,879 acres, of which 42,390 acres were sold in September, October and November. The sales of Branch Line lands for the eleven months were 13,653 acres. On the St. Vincent Extension contracts or guarantees to sell have been given on 325,000 acres, the sale to be completed when the land is deeded to the company.

Tarboro & Williamston.

This road was graded several years ago from Tarboro, N. C., westward to Williamston on the Roanoke, 32 miles; the bridge over Tar River was built and several miles of iron laid. The work was, however, abandoned and nothing has been since done. It is reported now that arrangements have been made to resume the work and complete the road. The line is through some very good country and vessels of considerable size can pass up the Roanoke to Williamston.

It is also proposed to complete a line from Williamston to Raleigh, as soon as this road is finished, by using the branch line owned by the Wilmington & Weldon, from Tarboro to Rocky Mount, 16 miles, and building about 45 miles of new road from Rocky Mount to Raleigh. This line would pass all the way through a good country, and could carry business to several railroads, or to water navigation at Williamston.

Union Railroad, Transfer & Stock Yards.

The Indianapolis *News* of December 24 says: "Yesterday morning at 6.45 the Belt engine, M. A. Downing, started from the Bee Line connection at Brightwood with 108 cars, a train three-fifths of a mile long, and brought it round to the Jeffersonville connection where five cars were dropped, coming up to the stock yard with 103 at 7:45. They were taken on round to the tracks of elevator B, where a portion were left, and 25 were run to the elevator and loaded before 10 o'clock. Most if not all of the monstrous train was to take grain from the elevator, and as each car would carry 400 bushels on an average, the total shipment would amount to 40,800 bushels, or the product of more than 2,000 acres at 20 bushels to the acre. It was the largest train ever brought into the city, and was in charge of Mr. Scott, the Superintendent of Transportation on the Belt, and Mr. Miller, Superintendent of Machinery. It was cheered several times at the crossing of other roads by outgoing trains that were blocked by its apparently interminable length. The Belt is a success already. It paid the first installment of interest on its debt and current expenses before it had any help from the Lafayette conection.

"The transfer business has steadily increased in weekly averages from the start. The first week of this month gave an average of 475 cars per day; the second 480, the last 547. Of the last week's average the daily transfers of through freight, exclusive of cars taking stock to the yards and taking it from the yards to the pork houses was 443; each one pays $1. The daily relief to the obstruction of the city streets amounted to the removal of a continuous train of 2⅜ miles in length, equal with the usual speed inside the city, and the stoppages to two full hours or more."

Wheeling & Lake Erie.

The annual meeting of this company at Norwalk, O., last week, was a very stormy one, in consequence of the charges made against President Robinson by H. B. Willson, contractor for the road. The meeting lasted three days and after a very sharp fight the five directors favored by the Willson interest were chosen, giving him, with those holding over, a majority of the board. In order to do this, however, about 1,000 shares were not allowed to vote, on the ground that the certificates had not been issued 30 days before the election, as required by law. The defeated party claim that the election was not legal and threaten a suit to set it aside.

ANNUAL REPORTS.

Mississippi & Tennessee.

This company owns and works a line from Memphis, Tenn., southward to Grenada, Miss., 100 miles, connecting at Grenada with the Chicago, St. Louis & New Orleans road. The latest report is for the year ending Sept. 30, 1877.

The general balance sheet is as follows:

Stock ($8,254 per mile)		$825,400
Funded debts ($21,547 per mile)		2,154,714
Floating debt		75,198
Receipts		433,440
Discount on Tennessee bonds, etc		16,076
Total ($35,043 per mile)		$3,504,828
Construction, reconstruction and equipment ($29,567 per mile)	$2,956,654	
Interest and expenses	402,126	
Assets	26,869	
Profit and loss	59,179	
		3,504,828

The funded debt was reduced $18,360 and the floating debt $25,922 during the year. The earnings for the year were:

	1876-77.	1875-76.	Inc. or Dec.	P. c.
Passengers	$110,671	$126,169	Dec. $15,498	12.3
Freight	310,231	330,168	Dec. 19,937	6.0
Express and mails	10,154	11,263	Dec. 1,109	9.8
Privileges	2,384	1,672	Inc. 712	4.2
Total	$433,440	$469,272	Dec. $35,832	7.6
Expenses	220,672	227,474	Dec. 6,802	3.0
Net earnings	$212,768	$241,798	Dec. $29,030	12.0
Gross earn. per mile	4,334	4,693	Dec. 359	7.6
Net. " " "	2,128	2,418	Dec. 290	12.0
Per cent. of expenses	50.92	48.48	Inc. 2.44	5.0

The falling off was entirely in local business and was due chiefly to a short cotton crop along the line. The report says:

"Although our gross earnings have been greatly reduced from local causes, bad crop, etc., we have from the earnings of the road kept it in good order, made all improvements and additions necessary, have paid promptly all interest on our floating and funded debt, besides having reduced our funded debt $18,360, and our floating debt $25,922.

"At a meeting of our stockholders, held on the 30th of July last, a most satisfactory plan was adopted by which we propose to consolidate our entire funded debt by the issue of new bonds having twenty-five years to run. Our first mortgage bonds matured April 1, 1876, and hence it was necessary that some fair and equitable plan should be adopted to retire them. To that end the plan above stated was adopted, and is so clearly beneficial to the holders of our obligations and the company that it has been accepted readily by all parties, and will no doubt be consummated in the next few months. This will reduce our funded debt to $2,100,000, and place it in a much more satisfactory shape than at present, and will also furnish us with the means to connect our line with the other roads terminating in the city, and also with the river."

Third Avenue.

The Third Avenue Railroad Company in New York is probably the largest carrier of passengers of any street railroad in the United States. In view of this fact, its statements may be of interest as showing the profits of a street railroad of large traffic. The following figures are from the report to the State Engineer for the year ending Sept. 30, 1877.

The capital account at the close of the year was as follows:

Capital stock ($250,000 per mile)	$2,000,000 00
Funded debt ($250,000 per mile)	2,000,000 00
Total ($500,000 per mile)	$4,000,000 00
Cost of road-bed and track ($221,982 per mile)	1,775,858 14
Cost of land, buildings, etc	1,782,485 52
Cost of cars ($1,007 each)	286,038 25
Cost of horses and harness	385,505 31
Total	$4,229,887 22

The earnings and expenses for the year were as follows:

	1876-77.	1875-76.	Inc. or Dec.	P. c.
Passengers	$1,679,206 28	$1,729,572 81	Dec. $50,366 53	2.9
Rents, manure, etc.	51,249 22	51,227 58	Inc. 21 64	..
Total	$1,730,455 50	$1,780,800 39	Dec. $50,344 89	2.8
Expenses	1,064,180 94	1,192,492 89	Dec. 128,311 95	10.7
Net earn.	$666,274 56	$588,307 50	Inc. $77,967 06	13.3
Per cent. of expen.	61 50	66.96	Dec. 5.46	8.2

The statements of equipment and traffic, with some averages derived therefrom, are as follows:

	1876-77.	1875-76.	Inc. or Dec.	P. c.
Length of road, miles	8	8	.....	....
Number of passenger cars	275	276	Dec. 1	0.4
Number of freight cars	9	9	.....	....
Number of horses and mules	1,980	1,979	Dec. 19	1.0
Number of horses to each car	7.13	7.17	Dec. 0.04	0.6
Number of passengers carried	30,700,000	31,700,000	Dec. 1,000,000	3.6
Rates of fare	5 and 6 cts.	5 and 6 cts.	.....	....
Average receipt per passenger	5.471 "	5.456 "	Inc. 0.015 ct.	0.3
Gross earnings per mile of road	$216,306 94	$222,600 05	Dec. $6,293 11	2.8
Net earnings per mile of road	83,284 32	73,538 56	Inc. 9,745 76	13.3
Gross earn. per passenger car	6,292 56	6,452 18	Dec. 159 62	2.5
Net earn. per passenger car	2,422 93	2,131 55	Inc. 291 38	13.7
Gross earn. per car per day	17.24	17.63	Dec. 0.39	2.2
Net earn. per car per day	6.64	5.82	Inc. 0.82	14.1

The freight cars are used exclusively in the company's service, as it carries no freight for others.

The disposition of net earnings was as follows:

Net earnings		$666,274 56
Real estate sold		88,000 00
Total		$754,274 56
Interest	$140,000	
Coupon bonds paid	58,000	
Real estate at Harlem	7,500	
Dividends, 11 per cent.	220,000	
Payment to stockholders under resolution of board of directors	300,000	
		725,500 00
Surplus		$28,774 56

It will be seen that the stockholders received 26 per cent. during the year. During the previous year 15½ per cent. dividends were paid.

There were two persons killed and six injured on the road during the year.